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CCCCLIX.—MAPLE SUGAR.

(*Acer saccharinum*, Wangh.)

Valuable sugar and syrup are obtained in the United States and Canada from the stem of the Sugar Maple. The stems are bored in early spring and the juice, collected in vessels, is boiled as quickly as possible to prevent fermentation. The industry is carried on over an extensive tract of country and the produce is used locally. Little, if any of it, comes into external commerce. Hitherto it has been difficult to obtain reliable information as to the extent or value of the maple sugar industry in the United States. From the following extract it will be noticed that about 10 million pounds of maple sugar are produced annually, and that the value of the sugar and syrup together reaches about one million dollars.

The Sugar Maple (*Acer saccharinum*, Wangh.) is a noble tree, often 100 feet high with a trunk 3 or 4 feet in diameter. The leaves are three to five-lobed with rounded sinuses. The fruit, very similar to our maple (or sycamore), is smooth, the wings vary from half an inch to rather more than an inch in length and are broad, thin, and usually spreading. The tree is one of the most widely and generally distributed of any in eastern North America. It extends southward from Canada along the Alleghany Mountains to Georgia and Florida; westward along the valleys of the St. Lawrence to Minnesota, Nebraska, Kansas, and Eastern Texas.

This tree was introduced to England in 1735. The timber is more valuable and more generally used than that of any other American maple. Accidental forms of the wood, known as "curled maple" and "bird's-eye maple," are highly prized in cabinet-making.

"Much of the splendour of the American forests in early autumn is due to the abundance of the sugar maple, which is unsurpassed in brilliancy of colour by any upland tree."

The nutritious and sugary properties of the sap of the maple were known to the Indians before the earliest settlement of Europeans.

Maple sugar is identical chemically with that yielded by the sugar-cane.

"It has the appearance of raw cane-sugar, except that it is rather darker in colour, and it loses in refining the peculiar flavour for which it is valued. It often contains a considerable per-centage of malate of lime, a substance that feels like sand in the mouth, and seems to

increase in quantity in proportion to the length of time the tree has been tapped."

Professor Sargent (*Silva of North America*, ii. 98), from whom the above extracts have been taken, quotes as follows :—

"Sugar-making begins with the upward flow of the crude sap, or between the end of February and the beginning of April, as the season is early or late, and continues during three or four weeks. Trees 20 or 30 years old are considered the most productive and yield the purest sugar, although sap can be drawn from the tree year after year without seriously injuring it. Trees exist in northern New York which are known to have yielded sugar every year for a century, and which, while much swollen about the base from repeated wounds, are still vigorous and fruitful. A tree of the average size will give in an ordinary season 20 or 30 gallons of sap, usually containing from 2 to 3 per cent. of sugar, or from $2\frac{2}{3}$ to $3\frac{1}{3}$ ounces per gallon. Individual trees, however, vary much in productiveness; and those standing by themselves on high ground, with a large development of roots and branches, generally yield more sap than trees crowded together in the forest. The highest per-centage of sugar recorded is 10·20 for a tree in Vermont, in a small flow late in the season, 5·01 per cent. being the average of this tree during the season." (Wiley, *Bull.* 51, *Chem. Div. Dept. Agric.*, 1885.)

The following article taken from the *Louisiana Planter*, February 2, 1895, gives the present production of maple sugar in the United States :—

"During the existence of the bounty law it was thought that data would be secured covering the entire production of maple sugar in the United States, but the great number of small producers who made no application for the bounty, owing to the small amounts involved, has rendered the data very incomplete, although the total production of this article is far greater than most persons imagine. From the last report of the Commissioner of Internal Revenue, we learn that the maple sugar produced during the fiscal year ended June 30, 1892, by licensed maple sugar producers who submitted reports, amounted to a little short of four millions of pounds. During the fiscal year ended June 30, 1893, the production reported aggregated over 7,500,000 pounds, and for the year ending June 30, 1890, the data secured indicates about the same production. From this it would seem that the total production of maple sugars in the United States exceeds 10,000,000 pounds, and as this article is sold as candy rather than sugar, and as an immense amount of maple molasses or syrup is sold without being manufactured into sugar, it is evident that the total production of sugar and syrup from maple sap reaches about $1,000,000 annually.

"New Hampshire leads in maple sugar production with a yield of about 5,000,000 pounds. New York follows with the production exceeding 1,500,000 pounds, Pennsylvania about half a million, Ohio a little less than half a million, other States reporting smaller quantities. Over 3,600,000 trees were tapped to produce 7,500,000 pounds of sugar, indicating an average production of about two pounds per tree per season."

Brigade-Surgeon Aitchison, C.I.E., F.R.S., who was much interested in the introduction of the sugar maple into Kashmir, applied to Kew for assistance in obtaining a supply of seed. After some difficulty a sufficient quantity was obtained through the kind offices of Messrs. Thomas Meehan & Son, of Germantown, Philadelphia, and despatched to India. They remark in the letter of advice:—"You are no doubt

well aware that in the case of the double samara of the sugar maple one of them is almost invariably hollow. It is rare to find both good."

CCCCLX.—ANBURY, CLUB-ROOT, OR FINGER AND TOE.

(With plate.)

This unfortunately well-known plant malady has been made the subject of the most careful scientific investigation. Of this a good account is given by Mr. Carruthers in the *Journal of the Royal Agricultural Society*, 3rd ser., vol. iv., pp. 334–339 (1893). The following description is borrowed from it:—

"This disease, caused by *Plasmodiophora Brassicæ*, Woronin, shows itself by the tops of the attacked turnips becoming yellow and soft and drooping in the heat of the sun. When the bulb is taken out of the ground the rootlets which issue from it, and through which the plant obtains its nourishment from the soil, are found to be covered with irregular warty excrescences. In the progress of the disease the bulb itself becomes rotten, and in the advanced stages a most offensive putrid odour is given off."

The appearance of the diseased roots is well illustrated in the accompanying illustration, which is borrowed from von Tubeuf's *Pflanzenkrankheiten*.

For a description of the organism discovered by Woronin, which is the cause of the disease, reference may be made to Mr. Carruther's paper.

The late Dr. Augustus Voelcker made an elaborate inquiry into the conditions favourable to it. These were published in the *Journal of the Royal Agricultural Society* for 1859 (vol. xx., pp. 101–105). He "concluded that the cause of anbury is justly referred in most instances to the absence or insufficiency of lime in light sandy soils."

"It has since been observed . . . . the application of lime, chalk, or marl, has prevented the reappearance of the disease in fields where it had previously been present."

"It has recently been asserted that the sulphur present in manures saturated with sulphuric acid favours the appearance of the disease (Carruthers, *l.c.*, p. 335). In the *Journal of the Royal Agricultural Society* for 1894 (3rd ser., vol. v., pp. 808–811), Professor William Somerville describes some important experiments which show that soils free from the disease can be easily infected with it. Two of his conclusions may be quoted:—

"1. That Finger and Toe (locally known in the north as 'grub') is an extremely infectious disease, and may be easily induced by inoculating a soil perfectly free from the disease—and holding much more than an average quantity of lime—with soil from a diseased field.

"2. That such diseased soil may be easily disinfected by lime, which points to the pathological phenomena being due to an organism, presumably *Plasmodiophora Brassicæ*" (p. 811).

The study of the conditions favourable or inimical to the organism, *Plasmodiophora*, which is the cause of the disease, have now been carried a step further, as the result of investigations made during the last four years in the Jodrell Laboratory of the Royal Gardens by Mr. G. Massee, F.L.S., a member of the scientific staff.

The important result is that free acid present in the soil is favourable to the organism, while a free alkali is unfavourable. This explains the old belief that sulphuric acid favoured the disease, though the suggestion that this was due to the sulphur present is, it would seem now, not to be the true solution.

The following account is extracted from Mr. Massee's paper printed in the *Proceedings of the Royal Society*, vol. 57, pp. 330–332 :—

The disease attacks turnips, rape, cabbages of all varieties, radishes, and, in fact, most cultivated plants belonging to the order *Cruciferæ*. Several common weeds are also attacked, namely, charlock (*Brassica Sinapistrum*, Boiss.), garlic-mustard (*Sisymbrium Alliaria*, Scop.), treacle-mustard (*Erysimum Cheiranthoides*, Linn.), and shepherd's purse (*Capsella Bursa-pastoris*, D.C.). The last-named is reported from the United States by Halsted,* and has not been observed to be diseased in Britain, although one of our commonest weeds.

Berkeley† appears to have been the first to investigate the disease from a scientific standpoint, and although he did not succeed in determining the true cause, distinctly states that microscopic examination revealed the presence of a factor previously unknown in connexion with plant diseases. Furthermore, Berkeley pointed out that wood ashes were a cure for the disease, and supposed this to be due to the presence of potash salts in the ash.

Plasmodiophora Brassicæ, Wor. (after von Tubeuf).

The following is an account of experiments conducted during four successive years at Kew.

* New Jersey Agric. Coll. Expt. Station; Bull., 98 (1893).
† *Gard. Chron.* p. 500, 1856.

1. Healthy seedling cabbages planted in soil that had two years previously produced a crop of diseased cabbages, became diseased. Check plants from the same batch of seed, grown in sterilised soil, remained free from disease.

A. *Experiments conducted in a Sterilised Solution of Stable Manure.*

2. The contents of two flasks were infected by adding crushed tubercles of a diseased cabbage root. Two per cent. of a saturated solution of potassium hydrate was added to the contents of one flask, and two per cent. of commercial sulphuric acid to the other. A young cabbage plant free from disease was then placed in each flash. At the end of two months the plant in the flask containing potassium hydrate was growing vigorously and perfectly free from disease, whereas the plant growing in the solution containing sulphuric acid was badly diseased, much more so than check plants growing in infected soil free from acid, for the same period of time. Similar experiments made during successive years always yielded the same result.

3. Two young cabbage plants showing decided symptoms of disease were placed in flasks containing the same proportions of potassium hydrate and sulphuric acid respectively as in Experiment 2. At the end of two months the plant growing in the solution containing potassium hydrate appeared to be perfectly healthy, the indications of nodules present on the root at the commencement of the experiment having become effaced by subsequent growth. The plant growing in the solution containing sulphuric acid was badly diseased.

Similar results were obtained in Experiments 2 and 3, when potassium hydrate was replaced by ammonium hydrate, and sulphuric acid by hydrochloric acid.

4. Two diseased seedling cabbages were placed in separate flasks of the sterilised solution. The liquid in one flask was saturated once a week with carbonic dioxide, the contents of the second flask not being interfered with in any way. At the end of two months both plants had the disease developed to the same extent, proving that carbonic acid is neutral as regards the development of *Plasmodiophora*.

B. *Experiments conducted with Sterilised Soil.*

5. Two pots of soil, sterilised by steam, were infected with the crushed roots of diseased cabbages. The soil in one pot was mixed with quicklime, that in the other with bone manure, having an acid reaction. A healthy cabbage seedling was planted in each pot, and at the end of two months the plant in the pot containing lime was perfectly healthy, whereas the plant in the soil containing acid bone manure was badly diseased.

6. Two pots containing soil mixed with quicklime and acid bone manure respectively had a diseased cabbage seedling placed in each. At the end of two months the disease was more developed in both seedlings than at the time of planting; proving that the presence of lime will not arrest the disease when the plants are once attacked.

Summary.

The foregoing observations and experiments demonstrate the following points:—

1. That in addition to cultivated plants, several common weeds belonging to the order *Cruciferæ* are attacked by the *Plasmodiophora*.

Hence the necessity for preventing the growth of such weeds in fields and hedge banks.

2. That the germs of disease are present in soil that has produced a diseased crop, and retain their vitality for at least two years.

3. That the development of *Plasmodiophora* is favoured by the presence of acids, and checked by the presence of alkalies, agreeing in this respect with the fungi rather than with bacteria.

4. For the purpose of sterilising infected soil, experiments prove that either a dressing of lime or a manure containing potash salts is effective, the last being most valuable, as it not only destroys the germs in the soil but also arrests the disease in seedling plants, and at the same time supplies one of the ingredients necessary for the healthy growth of turnips.

CCCCLXI.—FLORA OF THE SOLOMON ISLANDS.

The novelties of several small collections, from the above-named islands, presented to Kew within the last few years, have already been published in the *Annals of Botany*, v. (1891), pp. 501–508, pl. 27; vi. (1892), pp. 203–210, pl. 11–14; *Journal of the Linnean Society*, xxx. (1894), pp. 163–165 and 211–217, pl. 9–11; Hooker's *Icones Plantarum*, 4th series, iii. (1894), pl. 2207, 2247, and 2248; and *Kew Bulletin*, 1894, pp. 211–215.

In March of the present year a further small parcel was received from the Rev. R. B. Comins, including also a few species from Torres Islands and Banks Islands, situated between the Solomon group and the New Hebrides.

Unfortunately Mr. Comins's opportunities for collecting and preserving plants are very slight; yet in this small collection of about 30 species a dozen remain unidentified with previously described species. The material of some is, however, insufficient for description. Omitting the very common plants of no special interest, the following is an enumeration of the last consignment:—

Dilleniaceæ.

Dillenia ?—The petals are wanting, and the anthers have been eaten by insects, so that it is uncertain whether it belongs to this genus or *Wormia;* but from the foliage and calyx it appears to be an undescribed tree.

Habitat.—Florida, Solomon Islands, *Comins*, 291.

Mr. Comins notes that the natives declare that this tree, which occurs in the forests and attains a height of 100 feet, never ripens seeds, and can only be propagated by cuttings.

Anonaceæ.

Oxymitra (§ Goniothalamus) macrantha, *Hemsl.*; arbor usque ad 30 ped. alta, apice tantum ramosa (*Comins*), ramulis primum parce ferrugineo-puberulis, internodiis brevibus, foliis mediocribus petiolatis vix coriaceis ovato-oblongis apice obtusis vel rotundatis glabrescentibus, venis primariis lateralibus utrinque circiter 12 curvatis prope marginem inter se conjunctis, floribus lateritiis in trunco productis (*Comins*) breviter

pedunculatis pendulis ex adumbratione Cominsiana solitariis coriaceis glabris, calyce obscure trilobato lobis obtusis, petalis 3 exterioribus valde elongatis angustis caudatis vix acutis, petalis 3 interioribus brevibus supra medium connatis breviter unguiculatis corollam fenestratam formantibus, connectivo ultra loculos antherarum capitato, stylis filiformibus elongatis, carpellis numerosissimis magnis arcte confertis brevissime stipitatis pyriformibus vel ovoides apiculatis glabris minute verrucosis, seminibus 5–6 in quoque carpello orbicularibus compressis tomentosis.—*Hook, Ic. Pl.* tt. 2399, 2400.

Habitat.—Florida, Solomon Islands, *Comins*, 293.

Folia 4–6 poll. longa. *Calyx* circiter 1 poll. diametro. *Petala* exteriora usque ad 7 poll. longa, interiora circiter 7 lin. longa. *Torus* maturus 1–1¼ poll. diametro. *Carpella* 2 poll. longa. *Semina* 9–10 lin. diametro.

Baillon and other writers who combine *Oxymitra*, *Goniothalamus*, and the Fijian *Richella*, have been followed here, as there is no character of importance to separate them. The present is a somewhat anomalous species, the carpels being 5–6 ovulate and, sometimes, at least, all the ovules mature into seeds. *Goniothalamus uvarioides*, King (*Ann. Calc. Bot. Gard.* iv. t. 143), is also exceptional in having 4-seeded carpels.

Mr. Comins describes this as a riverside tree, attaining a height of 30 feet, and having a naked trunk on which the long pendent brick-red flowers are borne down to within 2 feet of the ground, and at intervals of about a foot.

Simarubeæ.

Samadera indica, Gærtn.—The distribution of this tree is remarkable. It inhabits South Concan, Malabar, Ceylon, Borneo, and the Philippines.

Habitat.—San Cristoval, Solomon Islands, *Comins*, 261.

Meliaceæ.

Dysoxylum sp. ?—Specimen mancum. This may be a new species, but as there are only detached flowers, and a small portion of a large pinnate leaf, the point is doubtful.

Habitat.—San Cristoval, Solomon Islands, *Comins*, 303.

Olacineæ.

Lasianthera papuana, Becc.—Flowering specimen of this singular plant. It is figured by Beccari, *Malesia*, i. t. 3.

Habitat.—San Cristoval, Solomon Islands, *Comins*, 41.

Stemonurus ? megacarpus, *Hemsl.*; arbor magna (*Comins*) foliis alternis breviter petiolatis subcoriaceis leviter obliquis ovato-oblongis obtusis vel acutis glabris, venis primariis lateralibus utrinque 8–10 subtus prominentibus, costa crassa, floribus purpureis (*Comins*) parvis anguste cymoso-paniculatis ramulis crassis subcarnosis, pedicellis brevibus calyce cupulari inæqualiter 4–5-lobato lobis rotundatis, petalis 4–5 valvatis oblongo-lanceolatis obtusis intus leviter carinatis, filamentis

brevissimis dilatatis, connectivo incrassato ultra loculos antherarum producto inappendiculato, loculis discretis, ovario 1-loculari, ovulis 2 collateralibus pendulis, fructu drupoideo magno ovoideo unispermo, endocarpio crasso dense suberoso, semine anguste ovoideo compresso, raphe lata prominente per totam seminis longitudinem extensa.—*Hook. Ic. Pl.* t. 2398.

Habitat.—Solomon Islands: San Cristoval, *Comins*, 89.

Folia 8–12 poll. longa et 4–5 poll. lata. *Panicula* 4–5 poll. longa (imperfecta?). *Pedicelli* 2–3 lin. longi. *Flores* circiter 3 lin. diametro. *Fructus* absque epicarpio carnoso 3 poll. longus, endocarpio 3–6 lin. crasso. *Semen* 2–2¼ poll. longum.

The genera of the Icacineæ, especially those to which the plant described is most nearly allied, have been so differently limited by different botanists that it is difficult to decide to which to refer a plant combining some of the characteristics of *Stemonurus* and *Gomphandra*, as defined by certain botanists. In the ovary and fruit *S.? megacarpus* strongly resembles *S. scorpioides*, Becc. (*Malesia*, 1. p. 113 t. 6), but the inflorescence and stamens are very different, and nearer those of some of his species of *Gomphandra*. Having to deal with only one species, the question of the genus must therefore remain uncertain.

Ampelideæ.

Leea sambucina, Willd.—Widely spread in India and Malaya, extending to the Philippine Islands and Australia.

Habitat.—San Cristoval, Solomon Islands, *Comins*, 307.

Leguminosæ.

Millettia ? gracillima, *Hemsl.*; frutex alte scandens (*Comins*), undique glaber, ramulis floriferis graciliusculis teretibus, foliis alternis graciliter petiolatis, foliolis 3–5 paribus oppositis omnibus petioluiatis (terminali longiore) tenuibus papyraceis obovato-lanceolatis vel oblongis vix acutis obtusis vel utrinque rotundatis, venis primariis lateralibus utrinque circiter 6, venis ultimis minute reticulantis, floribus albis (*Comins*), fasciculato-racemosis racemis gracillimis axillaribus simplicibus vel pauciramosis, pedicellis filiformibus, bracteis minutissimis, calyce pubescente brevissime 5-lobato, lobis 4 posterioribus latis rotundatis, anteriore angustiore carinato acuto, petalis subæquilongis breviter unguiculatis liberis glabris vexillo orbiculari emarginato vel breviter bilobato inappendiculato, alis oblongis apice rotundatis, carina obtusa fere recta, staminibus glabris 9 alte connatis vexillari omnino libero, ovario hirsuto sessili 3-ovulato, stylo sursum glabro incurvo stamina subæquante, legumine ignoto.

Habitat.—San Cristoval, Solomon Islands, *Comins*, 300.

Folia superiora 7–8 poll. longa; foliola inæqualia 2½–6 poll. longa; petioluli circiter 2 lineas longi. *Racemi* 5–15 poll. longi. *Pedicelli* 2–4 lin. longi. *Flores* 5–6 lin. longi. *Legumen* ignotum.

Mr. Comins describes this as "a climber on other trees, cutting into their bark until it almost buries its stem in theirs." In the absence of the pod its position is uncertain, but being one of the most elegant plants in the collection it has been described as far as the material goes.

Hansemannia oblonga, *Hemsl.* in *Kew Bulletin*, 1892, p. 125.—Further specimens showing that the leaflets sometimes attain at least 9 or 10 inches in length.

Habitat.—San Cristoval, Solomon Islands, *Comins*, 304.

COMBRETACEÆ.

Gyrocarpus americanus, Jacq.—This is one of the few littoral trees common to America and Polynesia; and it ranges all round the tropics, including Polynesia, eastward to Tahiti, but it is not recorded from the Hawaiian Islands.

Habitat.—Torres Islands, *Comins*, 310.

MELASTOMACEÆ.

Medinilla cauliflora, *Hemsl.*; frutex in arborum truncos epiphyticus (*Comins*), undique glaber, ramis floriferis crassis et ad nodos incrassatis, foliis ternis (an semper?) petiolatis subcoriaceis oblongo-lanceolatis leviter obliquis obtusis basi subcuneatis 3–5-nerviis venis obsoletis, floribus mediocribus albis (*Comins*) 4-meris ad nodos vetustos aphyllos fasciculatis distincte pedicellatis, pedicellis filiformibus, basi squamis minutis suffultis, calycis urceolati limbo brevi annulato truncato dentibus punctiformibus, petalis oblongo-spathulatis obtusis, staminibus 8 consimilibus fere æqualibus, filamentis linearibus tenuissimis, antheris fere rectis vel leviter curvatis anguste clavatis apice uniporosis per anthesin horizontalibus connectivo antice inappendiculato postice infra loculorum medium umbonato basi in calcar crassiusculum producto filamento medio antice affixo, ovario 4-loculare multiovulato, stylo glabro filiformi stamina longe superante, bacca alba carnosa compressa lateribus concavis.

Habitat.—Solomon Islands; Ysabal, *R. B. Comins*, 290.

Folia cum petiolo pollicari ad poll. longa et 2½ poll. lata. *Pedicelli* 3–6 lin. longi. *Petala* 5–6 lin. longa. *Bacca* parva (matura non visa) circiter 2 lin. diametro.

The stamens of this species differ materially from the typical stamen of the genus, and also from the deviations therefrom that have come under observation. In the present species the connective is thickened below the middle of the anther-cells and produced below their base in a rather thick, pointed spur, curved backwards and upwards, with the filament attached to its middle on the anterior side. The fruit, judging from somewhat imperfect material, it is true, appears to be of an unusual shape, being laterally compressed with concave sides. *Medinilla radicans*, Blume (*Rumphia*, i. p. 15. t. 3), agrees in having the connective distinctly produced below the anther-cells, but there the similarity ends.

RUBIACEÆ.

Timonius Forsteri, DC.—This curious tree is confined to Polynesia, where it inhabits the smaller islands. The localities known are: Torres Island; Romanzoff, in the Marshall Group; Vavau, Lifuka, and Savage Islands, in the Navigator's or Friendly Group; Palmerston, in the Hervey or Cook Group; Tahiti and Borabora, in the Society Group; and Bow Island, in the Low Archipelago. It varies very much in

foliage, and the specimens from Palmerston Island have thick almost fleshy branches, due probably to the presence of guano. Two very different looking Fijian trees are referred to the same genus.

Habitat.—Torres Islands, *Comins*, 311.

Ebenaceæ.

Diospyros acris, *Hemsl.;* arbor ad 40 ped. alta (*Comins*), præter pedicellos et flores pubescentes glabra, ramulis floriferis gracilibus lævibus viridibus, internodiis quam folia brevioribus, foliis alternis petiolatis coriaceis oblongo-lanceolatis obtusis vel interdum rotundatis basi subcuneatis supra subnitidis subtus pallidioribus venis primariis inconspicuis, floribus eburneis (*Comins*) mediocribus polygamis vel monoicis ♀ solitariis (an semper) ♂ vel hermaphroditis ternis, pedunculis pedicellisque brevibus, calycis fructiferi lobis 4 lignosis rotundatis deflexis marginibus reflexis, tubo annulo interno elevato instructo, corolla crassa coriacea sericeo-pubescente anguste urceolata, lobis tubo brevioribus demum recurvis obtusissimis, staminibus circiter 16 plus minus fasciculatis inæqualibus glabris, ovario hirsuto 8-loculari, loculis uniovulatis, fructu depresso-globoso, seminibus brunneis oblique oblongis compressis plano-convexis albumine æquabili densissime corneo.

Habitat.—Torres Islands, *Comins*, 312.

Folia 2–5 poll. longa; petiolus 2–3 lin. longus. *Pedunculi* 2–4 lin. longi, pedicellis brevioribus. *Calyx* fructifer circiter 1 poll. diametro. *Corolla* 5–6 lin. longa. *Fructus* circiter 15 lin. diametro. *Semina* 6–7 lin. longa.

Mr. Comins states that this tree has an acrid juice which blisters the body when applied to it.

Apocynaceæ.

Tabernæmontana anguinea, *Hemsl.;* arbor ad 20 ped. alta (*Comins*) undique glaberima, ramulis floriferis crassiusculis, foliis longe petiolatis oblongo-lanceolatis abrupte acuminatis basi cuneatis, venis primariis lateralibus utrinque 6–8 arcuatis excurrentibus, cymis parvis paucifloris axillaribus vel pseudo-terminalibus, floribus albis mediocribus breviter pedicellatis, calyce parvo breviter 5-dentato, dentibus deltoideis vix acutis, corollæ hypocraterimorphæ lobis valde obliquis sinistrorsum obtegentibus dextrorsum tortis undulato-crispatis, folliculis rubro-aurantiacis (*Comins*) elongatis cylindrico-clavatis supra medium seminiferis bis dextrorsum tortis, seminibus oblongis compressis rugosis.—*Hook. Ic. Pl.* t. 2397.

Habitat.—Solomon Islands: San Cristoval, *R. B. Comins*, 83.

Arbor 20-pedalis. *Folia* ramorum floriferorum cum petiolo 5–7 poll. longa et usque ad 2 poll. lata, petiolo 1–1½ poll. longa. *Cymæ* 2–3 poll. longæ, pedicellis circiter 3 lin. longis. *Flores* 10–12 lin. longi et lati. *Folliculi* 6–8 poll. longi, et supra medium siccitate 6 lin. diametro. *Semina* circiter semipollicaria.

Much elongated, twisted follicles are characteristic of this species; and from what Mr. Comins says about them, this is their normal form.

ASCLEPIADEÆ.

Tylophora sp.—Fruit is wanting to complete this apparently undescribed species.

Habitat.—Torres Islands, *Comins*, 309.

Dischidia Milnei, *Hemsl.*—Specimen in fruit. Folliculi angusti, recti, bipollicares.

Habitat.—San Cristoval, Solomon Islands, *Comins*, 165.

GESNERACEÆ.

Cyrtandra Cominsii, *Hemsl.*; frutex usque ad 6 ped. altus, foliis alternis (*Comins*) sed potius altero abortivo quasi alternis breviter petiolatis papyraceis late ovatis acutis basi rotundatis serrulato-denticulatis supra subnitidis secus venas strigillosis inter venas parcissime strigillosis subtus pallidis secus venas præcipue pubescentibus, floribus mediocribus umbellatim cymosis, cymis graciliter pedunculatis, pedunculis pedicellisque filiformibus ferrugineo-pubescentibus, bracteis bracteolisque parvis vel minutis cito deciduis, sepalis fere liberis inæqualibus oblongo-lanceolatis apiculatis corollæ tubum fere æquantibus, corolla glabra leviter oblique hypocraterimorpha, tubo leviter curvato, limbo fere æqualiter 5-lobato lobis brevibus rotundatis, genitalibus inclusis, filamentis filiformibus glabris antheris approximatis, ovario glabro, bacca carnosa succosa fere fusiformi.

Habitat.—Santa Maria, Banks Islands, *Comins*, 288.

Frutex 6-pedalis. *Folia* (2 tantum visa) circiter 7 poll. longa et 3½–4 poll. lata. *Cymæ* circiter 2 poll. diametro. *Pedunculi* (an perfecti ?) 1½–2 poll. longi. *Pedicelli* 2–3 lineas longi. *Corolla* 6–7 lin. longa, limbo circiter 4 lin. diametro. *Bacca* circiter 6 lin. longa.

Mr. Comins describes the calyx as white, he corolla yellow.

MONIMIACEÆ.

Hedycarya solomonensis, *Hemsl.*; frutex usque ad 12 ped. altus (*Comins*), undique glaber, cortice pallido, foliis breviter petiolatis tenuibus papyraceis vel fere membranaceis oblongo-lanceolatis acutis basi subcuneatis subtus pallidis venis primariis lateralibus utrinque circiter 5 distantibus longe intra marginem inter se arcuatim connexis, floribus non visis (axillaribus, *Comins*), carpellis nigris (*Comins* longe stipitatis globosis ovoideis, stipitibus crassis rubro-aurantiacis insignis (*Comins*), receptaculo irregulari pedunculato.

Habitat.—San Cristoval, Solomon Islands, *Comins*, 257.

Frutex 12-pedalis. *Folia* 6–8 poll. longa et 2½–3½ poll. lata, petiolo 3–4 lin. longo. *Pedunculus* unicus imperfectus visus circiter pollicaris. *Stipites* 3–5 lin. longi. *Carpella* 6–8 lin. diametro.

Mr. Comins describes this as a very conspicuous and striking shrub with black berries borne on orange-red stalks.

EUPHORBIACEÆ.

Daphniphyllum ? conglutinosum, *Hemsl.*; arbor magna (*Comins*) undique glabra, ramulis crassiusculis, foliis longe petiolatis subcoriaceis ovato-lanceolatis vel late ellipticis subito caudato-acuminatis acutis basi

rotundatis vel interdum subcuneatis paucicrenatis vel obscure lobulatis, venis primariis lateralibus utrinque 7–10 subtus sat conspicuis, floribus ♀ . . . floribus ♂ racemosis, racemis axillaribus rigidis paucifloris quam folia brevioribus, pedicellis brevibus basi bractea minuta squamiformi subtentis, calyce bivalvi sepalis crassis subcarnosis, margine scarioso, latis rotundatis appressis, staminibus numerosis filamentis brevissimis antheris magnis exsertis, drupa abortu unisperma obovato-oblonga basi calyce parvo irregulariter 5-lobato suffulta apice stylopodio lato crasso coronata, endocarpio tenui, mesocarpio crasso dense spongioso succo viscoso impleto, epicarpio tenui coriaceo, semine maturo non viso.

Habitat.—San Cristoval, Solomon Islands, *Comins*, 75.

Folia maxima cum petiolo 9 poll. longa, petiolo 2 poll longo; folia minora 3–4 poll. longa. *Racemi* $1\frac{1}{2}$–$3\frac{1}{2}$ poll. longi. *Pedicelli* 1–2 lin. longi. *Flores* ♂ 2–3 lineas diametro. *Drupa* 1 poll. longa et 6 lin. crassa.

Mr. Comins's note on this tree follows :—

"Large tree in bush; leaves alternate; flowers small, yellow. Fruit size of an almond, the skin covering a soft white substance like india rubber, within which is one seed."

He also states that the sap is the strongest cement known to the natives, and is used by them for mending shell armlets, &c. Further, that it is really equal, if not superior, to diamond and other prepared cements, and is used when they fail to hold.

With regard to the genus there is some doubt, but it has been described, so far as the material will permit, on account of its economic value, and because Mr. Comins has taken the trouble to collect such specimens as he could on two occasions.

Liliaceæ.

Smilax utilis, *Wright;* fruticosa, caule scandente tereti vel leviter striato, foliis oblongis apice acuminatis basi acutis trinerviis nitidis subcoriaceis, floribus pluribus umbellatis, masculis perianthii segmentis ligulatis reflexis marginibus hyalinis, staminibus 6 antheris brevibus albis, femineis non visis, bacca globosa trisperma, seminibus plano-convexis levibus.

Habitat.—San Cristoval and Malaita, Solomon Islands. *Comins*, 97 and 297.

Folia $2\frac{1}{2}$–$3\frac{1}{2}$ poll. longa, $1\frac{1}{4}$ poll. lata; *petiolus* 6 lin. longus. *Pedunculus* 1 poll. longus; *pedicelli* 5 lin. longi. *Perianthii* segmenta 2 lin. longa. *Bacca* 4 lin. diam.

This is most nearly related to *Smilax indica*, Vitm., from which it differs in having much narrower, shining leaves. The stems are used to tie fences.

Orchideæ.

Bulbophyllum Cominsii, *Rolfe;* rhizomate repente valido, pseudobulbis ovatis monophyllis, foliis oblongis obtusis basi attenuatis coriaceis, scapis unifloris, bracteis elliptico-lanceolatis subacutis basi tubulosis, sepalo postico ovato-oblongo obtuso subundulato lateralibus connatis postico similibus, petalis minutis triangulato-ovatis acutis, labello parvo

lateraliter compresso angusto basi sublato margine ciliato, columna brevissima dentibus brevibus acutis.

Habitat.—Florida, Solomon Islands, *Comins*, 289.

Pseudobulbi 8–9 lin. longi. *Folia* 4½–5 poll. longa, 1–1½ poll. lata. *Scapi* 4–5 poll. longi. *Bracteæ* 8–9 lin longæ. *Sepalum* posticum 2¾ poll. longum, 16 lin. latum, lateralia 2¼ poll. longa, 15 lin. lata. *Petala* 1 lin. longa. *Labellum* 3 lin. longum. *Columna* 2 lin. longa.

A remarkable species allied to *Bulbophyllum grandiflorum*, Blume, and *B. longisepalum*, Rolfe, though with the lateral sepals united into a single organ, like the dorsal sepal in shape but rather smaller. It has the habit and general appearance of the former, but, in addition to the character just pointed out, it has considerably smaller flowers. The collector describes the flowers as purple with white spots.

Appendicula Vieillardii, Reichb. f.—Previously collected in New Caledonia and the island of Aneitum, New Hebrides.

Habitat.—Malaita, Solomon Islands, *Comins*, 296.

"An epiphyte on trees on the sea-beach."

CCCCLXII.—SIAM GAMBOGE.

(*Garcinia Hanburyi*, Hook. f.)

The tree yielding Siam Gamboge (*Garcinia Hanburyi*, Hook. f.) is closely related to *G. Morella*, Desrouss, of Ceylon and Southern India. The former is a moderately large tree. The flowers are diœcious, the petals in both male and female flowers are fleshy and yellow. The fruit is the size of a crab-apple, yellowish-green when ripe. The tree is found on islands on the east coast of the Gulf of Siam, as well as on the mainland of Cambodia and Cochin-China. It is from these localities that practically the whole of the Gamboge of commerce is obtained. Gamboge is a gum resin yielded by the bark of the two species above mentioned. It is a powerful cathartic medicine, but its principal use is as a pigment in water-colour painting. It is also used to give colour to lacquer varnish for brass work, &c. The most recent account of Siam Gamboge is contained in a report on the trade of Siam for the year 1893, published by the Foreign Office (Annual Reports, 1895), No. 1520. Mr. de Bunsen, Her Majesty's *Chargé d'Affaires* at Bangkok, was good enough to communicate to Kew specimens of the leaves of the Gamboge trees collected on the spot by Mr. Beckett, and, although the material is not quite complete, there is little doubt they belong to *Garcinia Hanburyi*, Hook. f. The extract from the report is as follows:—

"*Gamboge* is, next to gum-benjamin, perhaps, the most interesting of Siamese products. Whilst gum-benjamin is peculiar to a small belt of land in the north, gamboge is a resinous product indigenous only in the islands and the sea coast of the Gulf of Siam, lying between the 10th and 12th degrees of north latitude.* I recently had the opportunity of paying a visit to this part of Siam, and it may be of interest to

* The heavy rainfall of this coast seems necessary to the existence of the tree.

describe the character of the tree and the mode of extracting the resin. The tree is known locally as 'Ton Rong.' It is found only in the islands of Koh Chang, Koh Kong, and Koh Rong, and the mainland of the Indo-Chinese Peninsula opposite these islands. The trees grow to the height of some 50 feet, and are straight-stemmed with no lower branches, owing probably to the dense shade of the forest in which they grow. None of those I saw had a diameter of more than 12 inches. Ten years' growth is said to be required before the tree is ready for tapping. This is carried on by the Cambodian and Siamese islanders in the rainy months from June to October, when the sap is vigorous, by cutting a spiral line round the trunk from a height of some 10 feet downwards to the ground. Down these grooves the resin wells out of the bark and trickles in a viscous stream into hollow bamboos placed at the base of the tree, and from these it is decanted into smaller bamboos, where it is left for about one month to solidify. To remove the gamboge the bamboo is placed over a red-hot fire, and the bamboo husk cracking off, there is left the article known as 'pipe' gamboge. The trees can be tapped two or three times during one season, and at the end of the season their trunks present a curious network of intersecting spirals. Care must be taken to prevent the rain-water mixing with the resin in the grooves, as any mixture of water causes honey-combing and black discolouration, and a consequent depreciation of from 20 to 30 ticals (2*l.*) per picul in value. The most valuable gamboge is that which is the least honey-combed or discoloured, and is all the more difficult to obtain, considering the period of heavy rains during which the resin is extracted. The bamboos contain on an average rather less than 1 lb. of gamboge, or about 170 bamboos to the picul. The price asked by the pickers themselves is at the rate of 2 ticals (3*s.*) for five bamboos full, and the local price is at the rate of 2 ticals (3*s.*) for three, or 65 ticals (4*l.* 18*s.*) per hundred, or about 8*l.* 7*s.* per picul. The whole output is sold to local Chinese traders and taken by sailing boat to Bangkok."

CCCCLXIII.—IPOH POISON.

(Supplementary Note.)

The *Kew Bulletin* for 1891 (pp. 259–268) contains an article summarising the information which had been obtained as to the Ipoh poison of the Malay Peninsula.

In a communication from Mr. L. Wray jun, Curator, Perak Government Museum, it was stated that while the Sakais living in the plains employ the *Antiaris* poison, the Sakais of the hills use a poison prepared from three hill plants called *ipoh aker*, *prual*, and *lampong*.

Further material has now been received from Mr. Wray which throws additional light on the identity of two of these plants. Dr. Stapf has accordingly, in the following notes, been able to revise his determinations:—

Ipoh Aker was stated (l.c. p. 267) to be "closely allied to *Strychnos Maingayi*, and probably only a different state of it." The copious material which I have now before me of *Strychnos Maingayi* as well as of the *Ipoh Aker* plant, renders it evident that the latter is not *S. Maingayi*, although probably a close congener. It differs from *S. Maingayi* in the almost papery leaves which are very like those of

S. wallichiana, Benth., and in the glabrous ovary. It is probably a new species; but I cannot describe it in the absence of flowers.

Prual was determined to belong to the natural order *Rubiaceæ;* but as the material then at hand consisted only of a young barren branch it was impossible to go beyond the vague suggestion that it might be a species of *Urophyllum* or *Lasianthus*, certain species of which exhibit a great similarity of habit. The correctness of the determination of *Prual* as a Rubiacea was called in question by Mr. Holmes and Professor Radlkofer (*Pharmaceutical Journal*, 1891, p. 620); yet a repeated examination of the material confirmed me in my opinion as to the systematic affinity of the plant (*Pharmaceutical Journal*, 1891, p. 660). From the material now at hand it appears that the plant is *Coptosapelta flavescens*, Korth., a Rubiacea of the *Cinchona* group. The genus *Coptosapelta* comprises at present two described species, *C. flavescens*, Korth., and *C. Griffithii*, Hook. fil., to which, however, several more might be added from the material preserved at Kew. The genus extends from the Malay Peninsula to the Philippines and New Guinea. *C. flavescens* ranges from the Malay Peninsula and Sumatra to Java and Borneo; *C. Griffithii* is limited to the southern part of the Malay Peninsula, and other species still undescribed were collected in Penang, Java, Sarawak, Luzon, and New Guinea. *Coptosapelta* is, beside *Hymenodictyon*, its nearest ally, the only representative of the subtribe *Eucinchoneæ* in Malaya; the remainder being mostly natives of tropical America and extra-tropical South America.

A small quantity of the root bark of *Prual*, from Perak, was examined by Dr. Ralph Stockman with respect to its physiological action on animals, and a short account of the results was published by him in the *Pharmaceutical Journal*, 1894, p. 561. If this root bark was actually derived from the same plant from which the herbarium specimens communicated by Mr. L. Wray as *Prual* were cut, then *Coptosapelta* must be counted in future among the poisonous plants. Up to the present, however, *Coptosapelta* was not known to possess poisonous or otherwise prominent chemical properties. But it may be mentioned that *Hymenodictyon excelsum*, Wall., an allied plant, and a native of India, yields an alkaloid "Hymenodictyonine," the chemical properties of which "display a close analogy with those of nicotine" (Watt, *Dict. Econ. Prod. India*, iv., 319), and the inner bark of this plant has been long employed by the Hindoos as a febrifuge and antiperiodic.

In the *Kew Bulletin* (1891, p. 264) reference was made to other ingredients sometimes mixed with the Ipoh by the Semangs. One of these was *likir*, an Aroid sent by Mr. Wray to the Calcutta Botanical Gardens for identification. It has now been ascertained there to be *Amorphophallus Prainii*, Hook. f.

CCCCLXIV.—DIAGNOSES AFRICANÆ, VI.

(*Continued from p.* 99.)

The following descriptions were originally intended for the *Decades Kewenses*, consequently they are not quite uniform with the preceding descriptions under this head, being rather more detailed. Six of them were communicated by Mr. E. E. Galpin, of Queenstown, Cape Colony, and these are drawn up on a somewhat different plan; but it was not considered desirable to alter them, beyond converting the metrical

measurements into inches and lines or twelfths of an inch. They relate to plants of exceptional interest, either on account of their beauty or their distribution.

217. **Aphloia myrtiflora**, *Galpin* [Bixineæ]; arbuscula 20-pedalis, ramulis divaricatis flexuosis; folia oblongo-elliptica, leviter acuminata, serrulata, glabra, 2–2¼ poll. longa, 6–8½ lin. lata, petiolis circa 1½ lin. longis; flores axillares, solitarii, sepala persistentia, petaloidea, alba, alte 5-fida, lobis convexis reflexis irregulariter imbricatis ovatis acutis vel obtusis 4½–5 lin expansis; pedicelli 6–8 lin. longi, 2–3 minutas squamiformes bracteas et unam majorem sub petaloideam proxime calycem ferentes; ovarium album, oblongo-fusinum; bacca obovoidea, alba, circa 3 lin. longa, 2 lin. lata, 2-sperma, semina reniformia.

Habitat.—Transvaal: in woods on the summit of Upper Moodies Mountain, Barberton. Alt. 4600 ft. October, 1890, *Galpin*, No. 1082.

218. **Polygala producta**, *N.E. Brown* [Polygalaceæ]; herbacea basi lignosa, caulibus subangulosis minutissime puberulis erectis, foliis alternis brevissime petiolatis adscendentibus linearibus obtusis vel acutis glabris, racemis terminalibus solitariis elongatis laxe multifloris, bracteis lanceolato-subulatis caducis, pedicellis brevibus recurvis glabris, sepalis exterioribus subæqualibus 2 inferioribus connatis cymbiformibus, alis ellipticis obtusis trinervis viridibus, petalis lateralibus carinam æquantibus integris late spathulalo-obovatis obtusissimis purpureis, carina purpurea integra infra apicem cristata, capsulis oblongis emarginatis glabris, seminibus sericeo-pubescentibus.

Habitat.—Transvaal: Barberton, in grassy places at Highland Creek, 3000 feet, March, *Galpin*, 844; Pretoria, *Rehmann*, 4565; *Mc Lea* in Herb. *Bolus*, 3142; Magalisberg, *Burke*, 374; Apies River, *Nelson*, 281; Griqualand East, rough slopes near Umzimkulu River, 2500 feet, March, *Tyson*, 2741, and *Herb. Norm. Austr. Afr.*, 883. Natal: *Gerrard*, 46,1781; Inanda Krantzkloof, *Wood*, 1171; Weenen County, *Southerland*.

Caules 7–24 poll. alti. *Folia* 6–15 lin. longa, 1–2 lin. lata. *Racemi* 3–12 poll. longi. *Bracteæ* 1–1½ lin. longæ. *Pedicelli*, 1½ lin. longi. *Sepala* exteriora 1–1½ lin. longa. *Alæ* 2–3 lin. longæ, 1¼–1¾ lin. lata. *Petala* 2¼–4 lin. longæ. *Carina* 2–3½ lin. longa.

219. **Dombeya pulchra**, *N. E. Brown* [Sterculiaceæ]; frutex ramis petiolis pedunculis pedicellisque plus minusve villoso-tomentosis, stipulis falcato-ovatis acutis vel acuminatis, foliis longe petiolatis rotundatis apice trilobis basi cordatis supra velutinis viridibus subtus dense velutino-tomentosis albis, cymis longe pedunculatis axillaribus solitariis 10–15 floris, pedicellis apice bibracteatis, bracteis ovatis acutis deciduis cum sepalis lanceolatis acuminatis reflexis velutino-tementosis, corolla magna petalis oblique rhomboideis truncatis albis basi purpureis glabris, staminodiis lineari-spathulatis quam stamina duplo longioribus albis basi purpureis.

Habitat.—Transvaal: Rimers Creek, Barberton, 3000–3500 feet February, *Galpin*, 804.

Fruteæ 5–8 ped. altus. *Foliorum petioli* 4–6½ poll. longi, laminæ 4–7½ longæ et latæ. *Stipulæ* 4–12 lin. longæ, 1½–3½ lin. latæ. *Pedunculi* 4–6 poll. longi. *Pedicelli* 7–15 lin. longi. *Bracteæ* 3½–7 lin. longæ, 2½–4 lin. latæ. *Sepala* 6 lin. longa, 1½ lin. lata. *Corolla* 1½–1¾ poll. diam. *Petala* 8–9 lin. longa, 7–8 lin. lata. *Staminodia* 6–7 lin. longa, apice ¾–1 lin. lata.

220. **Hermannia montana**, *N. E. Brown* [Sterculiaceæ]; humilis suffruticosa basi ramosa, ramis erectis simplicibus dense stellato-tomentosis fulvidis, foliis breviter petiolatis adscendentibus linearioblongis vel inferioribus oblingis utrinque acutis integris vel leviter crenulatis in siccis complicatis dense stellato-tomentosis subvelutinis subtus fulvidis, stipulis erectis lanceolatis acutis stellato-tomentosis, cymis breviter pedunculatis subumbellatim 3–5-floris bracteatis, bracteis liberis vel interdum plus minusve connatis lanceolatis acutis atque pedicellis brevibus calycibusque glanduloso-tomentosis, calyce infra medium 5 loba lobis lanceolatis acutis erectis intus laxe tomentosis, petalis luteis obovatis unguibus pubescentibus canaliculatis, staminibus quam petala multo brevioribus, filamentis linearibus pubescentibus supra medium truncato-cuspidatis vix vel non dilatatis, ovario tomentoso.

Habitat.—Transvaal: upper slopes of the Saddleback Range near Barberton, 4000–5000 feet, February, *Galpin*, 831.

Planta 5–7 poll. alta. *Foliorum petioli* 1–3 poll. longi, laminæ $1\frac{1}{4}$–$2\frac{1}{2}$ poll. longæ, 2–7 lin. latæ. *Stipulæ* 3–5 lin. longæ, $\frac{3}{4}$–1 lin. latæ. *Pedunculi* 2 lin. longi. *Bracteæ* 3–4 lin. longæ, 1–$1\frac{1}{2}$ lin. latæ. *Calyx* 3 lin. longus, lobi 1 lin. lati. *Petala* $3\frac{1}{2}$–4 lin. longa, $1\frac{1}{2}$–2 lin. lata. *Filamenta* $1\frac{1}{2}$–2 lin. longa. *Antheræ* $1\frac{1}{2}$–2 lin. longæ.

221. **Hermannia grandifolia**, *N. E. Brown* [Sterculiaceæ]; caulibus elongatis ramosis flexuosis pilis stellatis stipitatis asperis, foliis petiolatis elongato-cordato-ovatis acutis vel obtusis supra sparse stellato-scaberulis subtus molliter stellato-tomentosis, stipulis magnis patentibus vel reflexis latissime ovatis vel subrotundatis dentatis acutis stellato-pubescentibus, floribus anguste paniculatis, pedunculis bifloris, bracteis connatis bifidis cum pedicellis inæqualibus calycibusque glanduloso-tomentosis, calyce ad medium 5-lobato intus pubescente, petalis oblanceolato-obovatis obtusis utrinque pubescentibus unguibus canaliculatis, staminibus quam petala multo brevioribus, filamentis linearibus stellato-pubescentibus supra medium abrupte truncato-cuspidatis vix vel non dilatatis, ovario tomentoso.

Habitat.—Transvaal: beside the stream, Great Scott valley, Barberton, 2600 feet, April, *Galpin*, 940.

Rami floriferi 6–10 poll. longi. *Foliorum caulinorum petioli* 8–9 lin. longi, laminæ $2\frac{3}{4}$–$4\frac{1}{4}$ poll. longæ, $1\frac{1}{4}$–2 poll. latæ, ramorum lateralium 4–8 lin. longi, laminæ 9–18 lin. longæ, 4–10 lin. latæ. *Stipulæ* 3–6 lin. longæ et latæ. *Pedunculi* 3–5 lin. longi. *Bracteæ* 3–4 lin. longæ. *Pedicellus* inferior 1 lin. longus, superior 4–5 lin longis. *Calyx* 3 lin. longus, lobi 1 lin. lati. *Petala* 4–5 lin. longa, $1\frac{1}{3}$–$1\frac{1}{2}$ lin. lata. *Filamenta* $2\frac{1}{2}$ lin. longa, *Antheræ* 2 lin. longæ.

222. **Geranium pulchrum**, *N. E. Brown* [Geraniaceæ]; herbaceum perenne, caulibus erectis superne laxe ramosis patente pubescentibus glanduloso-pubescentibus, foliis petiolatis (inferioribus longissime) rotundatis ad medium vel ultra palmatim 5–7 lobatis lobis irregulariter sublobulatis et dentatis supra viridibus pubescentibus subtus dense albo-tomentosis, stipulis 3–7 partitis segmentis lineari-subulatis acuminatis pubescentibus ciliatis, pedunculis bifloris cum pedicellis bracteisque lineari-subulatis patente glanduloso-pubescentibus, floribus speciosis magnis, sepalis exterioribus lanceolato-ovatis acutis interioribus ovato-oblongis omnibus apiculatis extus glanduloso-pubescentibus, petalis latissime obovatis purpureis calyce duplo longioribus, ovario piloso, stylo glanduloso-pubescente, seminibus glabris immaturis punctatis.

Habitat.—Natal : on the Drakensberg, in swamps, 6000—7000 feet, January, *Evans*, 378.

Caules 2–2½ ped. alti. *Foliorum inferiorum petioli* 3½–8½ poll. longi, superiorum 6–18 lin. longi, laminæ 1½–3 poll. diam. *Stipulæ* 3–8 lin. longæ. *Pedunculi* 1–3 poll. longi. *Bracteæ* 3–5 lin. longæ. *Sepala* 5–6 lin. longa, 1½–2 lin. lata. *Petala* 7–10 lin. longa, 7–9 lin lata.

223. **Pelargonium dispar**, *N. E. Brown* [Geraniaceæ]; caulibus erectis simplicibus vel parce et breviter ramosis herbaceis pubescentibus vel pilosis pilis patentibus, foliis oppositis petiolatis late ovato-cordatis sublobatis obtusis lobis brevissimis obtuse rotundatis crenatis utrinque molliter pubescentibus, petiolis pilosis, stipulis ovatis vel ovato-lanceolatis acuminatis integris bifidis vel bipartitis pilosis vel glabris ciliatis, pedunculo quam petiolus longiore gracili 1–3 floro apice 2–4 bracteato piloso, bracteis lanceolatis acuminatis marginibus longe ciliatis, pedicello gracili piloso, sepalis lanceolatis acuminatis pilosis vel subglabris ciliatis, calcari elongato, petalis subæqualibus quam sepala duplo longioribus anguste oblanceolatis obtusissimis albis vel pallide roseis rubro-venosis, staminibus 7 fertilibus glabris quam petala brevioribus 3 sterilibus minutis dentiformibus, ovario glabro, stylo pubescente.

Habitat.—Natal : Drakensberg, Tiger Cave Valley, 6000–7000 feet, among grass, January, *Evans*, 371; slopes of Mount Erskine, 5000–6000 feet, January, *Evans* 403.

Caules 8–18 poll. alti. *Foliorum petioli* 2 lin.–2 poll. longi, laminæ ¾–2 poll. longæ, ¾–1¾ poll. latæ. *Stipulæ* 2–4 lin. longæ, 1–2 lin. latæ. *Pedunculi* 7–16 lin. longi. *Bracteæ* 2–2½ lin. longæ. *Pedicelli* 5–9 lin. longi. *Sepala* 3 lin. longa, ½–1 lin. lata. *Calcar* 3–5 lin. longum. *Petala* 4½–6 lin. longa, 1¼–1¾ lin. lata.

224. **Vitis succulenta**, *Galpin* [Ampelideæ]; caules crasso-carnosi ramosi, quadrangulares, glabri, virides, 9 lin. crassi, margines cartilagini rubri tincti; caules juniores 4-sulcati angulis undulatis sinuatis, in geniculis folio unico cirrho opposito; internodia 3¼–8 poll. longa; stipulæ binæ, late ovatæ, circa 2½ lin. longæ; petioli 4½ lin. longi; folia basi late cuneata vel subtruncata, trinervia, triloba, lobis dentatis acutis mucronatis, 9½–12 lin. longa, 14–16½ lin. lata; panicula ramosa, 5–8½ poll. longa; pedicelli sub umbellati summis incrassatis pedunculis, 3¾–4¼ lin. longi; calyx campanulatus, truncatus; petala 4, rosea, calyce triplo longiora, 1½ lin. longa; bacca ovoidea, mucronata, purpurea, 4¼ lin. longa, 3¾ lin. crassa, unilocularis, unisperma.

Habitat.—Transvaal : Kaap River valley near Barberton, alt. 1900–2100 feet, *Galpin*, 1177.

Stems 10–15 ft. long climbing amongst rocks on hillsides and in creeks in warm situations where sheltered by scrub. Flowers November. Fruits February.

225. **Crassula curta**, *N. E. Brown* [Crassulaceæ]; nana, perennis, basi breviter stolonifera, caule erecto simplici usque ad apicem foliati pilis albis retrorsis tecto, foliis radicalibus rosulatis oblanceolatis caulinis breviter connato-vaginatis lanceolatis acutis vel subacutis adscendentibus supra vel utrinque pilis albis pubescentibus marginibus longe ciliatis, cymis terminalibus parvis dense multifloris, bracteis lineari-oblongis vel linearibus ciliatis, pedicellis brevibus glabris, sepalis erectis lanceolatis

acuminatis glabris apice interdum scabris non ciliatis petalis subæquilongis, petalis oblongis obtusis dorso ad apicem minute calloso-apiculatis basi brevissime connatis gamopetalis albis, staminibus quam petala brevioribus antheris luteis, glandulis hypogynis subquadratis apice leviter dilatatis truncatis albis, carpellis oblique oblongis albidis, stylo brevi erecto.

Habitat.—Natal: Tabamhlope Mountain, 6000–7000 feet, February, *Evans*, 408; without locality, *Gerrard*, 1790?

Var. **rubra**, *N. E. Brown*; differt tantum floribus rubris.

Habitat.—Natal: Amawahqua Mountain at 6000–7000 feet, April, *Wood*, 4592.

Herba 1½–2½ poll. alta. *Folia* 3–5 lin. longa, 1½–2 lin. lata. *Cymæ* 5–9 lin. diam. *Bracteæ* 1½–3 lin. longæ, ¼–½ lin. latæ. *Pedicelli* 1–2 lin. longi. *Sepala* 1¼–1½ lin. longa, ½ lin. lata. *Petala* 1½ lin. longa ½ lin. lata.

226. **Crassula umbraticola**, *N. E. Brown* [Crassulaceæ]; pusilla, tuberosa, glabra, tubere pisiformi, caule erecto simplici, foliis 6–8 plerumque ad apicem caulis subconfertis oppositis petiolatis subreniformibus rotundatis vel elliptico-ovatis obtusis crenatis vel crenato-dentatis basi cuneatis, pedunculo terminali gracili cymoso-paucifloro, bracteis minutis, pedicellis gracilibus, sepalis lanceolatis acutis, petalis lanceolatis acutis quam sepala subtriplo longioribus albis, glandulis hypogynis minutis, carpellis oblique ovoideis stylis erectis coronatis.

Habitat.—Natal: Drakensberg, in caves, 6000–7000 feet, January, *Evans*, 362; without locality, *Gerrard*, 1448. Orange Free State, *Cooper*, 1084.

Planta 2½–6 poll. alta. *Tubera* 1½–2½ lin crassa. *Foliorum petioli* 1½–8 lin. longi, laminæ 3–11 lin. longæ, 4–12 lin. latæ. *Pedunculi* 6–18 lin. longi. *Pedicelli* 2–6 lin. longi. *Sepala* ½–¾ lin. longa. *Petala* 1¾–2 lin. longa, ½–⅔ lin. lata.

227. **Pavetta disarticulata**, *Galpin*, [Rubiaceæ]; frutex 8-15 pedalis glaberrimus, ramis crassis cinereis asperrimis cum cicatricibus, ramulis decussatis sub-compressis, folia petiolata, lancesolata vel oblongo-lanceolata, cuneata, punctata, acutiuscula vel acuminata, coriacea, laminis 4½–8 poll. longis, ¾–3 poll. latis, petiolis ¾–2½ poll. longis; stipulæ truncatæ in vaginam connatæ, 1–2-cuspidatæ; corymbi trichotomi, densi, 1¼–3 poll. longi; calyx cyathiformis, truncatus, minute dentatus, ½ lin. longus; corolla alba, tubo 4½–7 lin. longo, limbo 4½ lin. longo, stylus corollæ tubum 9½ lin. excedens; bacca virescens, 3–3½ lin. crassa.

Habitat.—Transvaal: Barberton, amongst scrub and rocks on the slopes and granite ridges surrounding the town; also Kaap river valley and French Bobs Hill, alt. 1800–2900 ft. *Galpin*, No. 406. Zululand: Indulindi, on the side of a stony hill, alt. about 1000 feet, *Wood*, 3954*a*.

228. **Anthospermum humile**, *N. E. Brown* [Rubiaceæ]; nanum suffruticosum basi ramosum, ramis erectis minute puberulis, foliis oppositis parvis adscendentibus linearibus acutis supra leviter canaliculatis glabris, stipulis connatis integris brevissime acutis, floribus dioicis vel interdum monoicis axillaribus sessilibus solitariis glabris,

calycis limbo inæqualiter 4 dentato, corollæ lobis lineari-lanceolatis acutis valde revolutis.

Habitat.—Natal: Ulundi, 5000–6000 feet, on damp rocks, January, *Evans*, 370.

Rami 1½–2 poll. longi, *Folia* 1½–5 lin. (plerumque 3 lin.) longa, ½ lin. lata. *Corollæ tubus* ½ lin. longus, lobi 1½ lin. longi, ⅓ lin. lati.

229. **Valeriana capensis,** *Thunb.* var. **lanceolata,** *N. E. Brown* [Valerianeæ]; foliis radicalibus lanceolatis vel ovato-lanceolatis obtuse acutis basi acutis rotundatis vel subcordatis integris vel plus minusve dentatis, caulinis pinnatisectis lobis lateralibus parvis lobo terminali elongato lanceolato.

Habitat.—Natal: top of Tabamhlope, 6000–7000 feet, January, *Evans*, 368. Kaffraria: Baziya Mountains 4000 feet, November, *Baur*, 546. Nyassaland: Mount Milanji, *Whyte*.

Foliorum radicalium petioli 9 lin. 4 poll. longi, laminæ 1¼–4½ poll. longæ, 6–10 lin. latæ.

230. **Felicia linearis,** *N. E. Brown* [Compositæ]; acaulis, foliis radicalibus numerosis confertis erectis linearibus obtusis succulentis glabris, scapis 1–2 inferne glabris superne pubescentibus foliis paucis parvis linearibus alternis instructis, capitulo solitario multifloro radiato, involucri bracteis subbiseriatis exterioribus linearibus obtusis interioribus multo longioribus lineari-oblongis subacutis omnibus ciliatis dorso glabris vittis aurantiaco-brunneis parvis plus minusve notatis et interdum purpureo-tinctis, floribus radii lineari-lingulatis acutis albis pallide roseis vel luteis, disci luteis, pappi setis uniseriatis minute scaberulis, achæniis immaturis compressis sparse pubescentibus.

Habitat.—Natal: top of Mount Erskine, 6000–7000 feet, January, *Evans*, 372; summit of Mount Amawahqua, 6000–7000 feet, April, *Wood*, 4631; Faku's Territory, *Sutherland*.

Folia 6 lin. 2 poll. longa, ½–1 lin. lata, *Scapi* 1–7 poll. longi. *Capitula* 9 lin. diam. *Involucri bracteæ interiores* 2½–3 lin. longæ, ¾ lin. latæ. *Corollæ radii* 3–3½ lin. longæ, disci 1½–1¾ lin. longæ.

231. **Helichrysum fulvum,** *N. E. Brown* [Compositæ]; caule elato superne paniculato-ramoso plus-minusve breviter setoso-glanduloso purpureo, foliis sessilibus amplexicaulibus subscabris glandulosis inferioribus oblanceolatis acutis deorsum longe attenuatis marginibus anguste albo-lanatis superioribus ovatis vel ovato-oblongis acutis marginibus scabris, capitulis ad apicem ramorum subconfertis circa 200–300 floris, involucri bracteis pluriseriatis brunneo-luteis subnitidis ovatis acutis interioribus quam discus subduplo longioribus radiantibus exterioribus gradatim minoribus glabris, receptaculo leviter foveolato, corolla breviter 5-dentata brunneo-lutea, pappi setis minute scabris apice leviter incrassatis, achæniis glabris.

Habitat.—Natal: Drakensberg, by streams in Tiger Cave Valley, 6000–7000 feet, January, *Evans*, 352; edge of brook near Van Reenans Pass, 5000–6000 feet, December, *Wood*, 4533.

Caules 2–3 ped. alti. *Folia inferiora* 4–5 poll. longa ½–1 poll. lata, superiora 1¼–3 poll. longa, 5–8 lin. lata. *Capitula* 6–8 lin. diam. *Involucri bracteæ interiores* 3 lin. longæ, ¾ lin. latæ. *Corollæ* 1¼–1½ lin. longæ.

232. **Senecio Evansi,** *N. E. Brown* [Compositæ]; arbuscula, caule erecto apice ramoso, ramis adscendentibus paniculatim ramulosis pubescentibus, foliis alternis lanceolatis pinnatisectis petiolatis, petiolo basi late alato amplexicauli-decurrente, lobis lateralibus anguste oblongis acutis patentibus integris terminali anguste lanceolato acuto integro vel basi plus minusve dentato vel lobulato utrinque subscabro marginibus scabris, foliis ramulorum lineari-lanceolatis amplexicaulibus acutis integris subscabris, pedunculis laxe 2–4 cephalis inferioribus axillaribus solitariis vel fasciculatis gracilibus folia subæquantibus vel brevioribus subscabrido-pubescentibus 2–3 bracteatis, bracteis linearibus vel linearilanceolatis, capitulis cymosis pedicellatis discoideis-25–30-floribus luteis, involucri bracteis subbiseriatis quam flores brevioribus oblongis vel elliptico-oblongis obtusis exterioribus angustioribus minute ciliatis subglabris vel dorso pilis paucis minutis, corolla tubulosa quinqueloba glabra, pappi setis scabris, achæniis saltem junioribus pubescentibus.

Habitat.—Natal: on the Drakensberg, 6000–7000 feet, January, *Evans*, 366.

Caules 10–12 ped. alti, 1½ poll. crassi. *Rami* 1½–2 ped. longi, ramuli 4–10 poll. longi. *Folia pinnatisecta* cum petiolis 1¾–4 poll. longa, 4–12 lin. lata, lobi laterales 1½–6 lin. longi, 1–2 lin. lati, lobo terminali 6–21 lin. longo, 1–4 lin. lato; folia integra 9–21 lin. longa, 1½–2 lin. lata. *Pedunculi* axillares 1–2½ poll. longi. *Pedicelli* 6 lin. 2 poll. longi. *Capitula* 4 lin. diam. *Involucri bracteæ* ⅓–2 lin. longæ, exteriores ½–¾ lin. latæ, interiores 1–1½ lin. latæ. *Corolla* 2 lin. longa.

233. **Euryops pedunculatus,** *N. E. Brown* [Compositæ]; frutex caule robusto apice ramoso, ramis simplicibus vel verticillatim triramulosis glabris apice sparse lanatis, foliis alternis plerumque trilobis lobis alternis linearibus subcarnosis acutis interdum bilobis vel integris linearibus glabris, pedunculis quam folia 3–4-plo longioribus terminalibus glabris, capitulis radiatis multifloris, involucri bracteis 10–12 ovatis vel ovato-oblongis acutis glabris, receptaculo denticulato, floribus radii apice minute tridentatis luteis, floribus disci campanulato-tubulosis basi angustatis, ovariis breviter albo-lanatis, pappi setis brevibus deciduis.

Habitat.—Natal: Olivers Hoek Pass, 4500 feet, January, *Wood*, 3601; top of Alatikulu Hill, 6000–7000 feet. January, *Evans*, 397. Orange Free State: without locality, *Cooper*, 2522. Transvaal: Houtbosh, *Rehmann*, 6133.

Caulis 2–3 ped. altus. *Rami* 8–12 poll. longi. *Folia* 1½–3 poll. longa, lobi ¾–1¾ poll. longi, ⅓–½ lin. lati. *Pedunculi* 6–10½ poll. longi. *Capitula* 9–10 lin. diam. *Involucri squamæ* 3–3½ lin. longæ, 1–1½ lin. latæ. *Corollæ radii* 5 lin. longæ, 1 lin. latæ, disci 1½–2 lin. longæ.

234. **Lactuca (Scariola) stenocephala,** *Baker* [Compositæ]; perennis, caulibus cæspitosis erectis ramosis, foliis radicalibus evanescentibus caulinis reductis linearibus, capitulis 5–floris in paniculam laxam corymbosam dispositis, pedunculis strictis elongatis, involucro cylindrico glabro, bracteis biseriatis exterioribus parvis ovatis interioribus 5 linearibus obtusis æqualibus viridibus, achænio cylindrico haud rostrato, pappo albo copioso achænio duplo longiore.

Habitat.—Interior of Western Lagos, *Dr. Rowland.*

Caulis 6–9 poll. longus. *Involucrum* 8–9 lin. longum. *Achænia* 3 lin. longa. *Pappus* 6 lin. longus.

235. **Lactuca (Brachyramphus) holophylla**, *Baker* [Compositæ]; erecta, perennis, foliis inferioribus fasciculatis lanceolatis integris sessilibus amplexicaulibus superioribus reductis basi sagittatis, caulibus teretibus gracilibus elongatis tenuiter pubescentibus, capitulis pauciforis in paniculam magnam laxissimam dispositis, involucro cylindrico, bracteis biseriatis exterioribus parvis interioribus 8 lanceolatis æqualibus viridibus glabris, achæniis brevibus castaneis in rostrum sensim angustatis, pappo albo molli.

Habitat.—Interior of Central Lagos, *Dr. Rowland.*

Caulis bipedalis. *Folia* inferiora 3–4 poll. longa, 3–4 lin. lata. *Involucrum* 6 lin. longum. *Achænium* 3 lin. longum, cum rostro $1\frac{1}{2}$ lin. longo. *Pappus* 3 lin. longus.

236. **Wahlenbergia pinifolia**, *N.E. Brown* [Campanulaceæ]; perennis basi ramosa, caulibus erectis simplicibus, foliis densissime confertis patentibus semitereto-subulatis supra canaliculatis calloso-acutis glabris, floribus axillaribus erectis pedicellatis ad apicem caulis dense confertis, pedicellis 2–3-bracteatis pubescentibus, bracteis foliis conformibus ciliatis, calycis lobis 5 subulatis ciliatis quam tubus subhemisphæricus subtriplo longioribus, corolla campanulato-infundibuliformi breviter 5-loba glabra cærulea, filamentis basi dilatatis, ovario triloculari.

Habitat.—Natal: Weenen County at waterfall No. 7, on damp rocks, 5000–6000 feet, February, *Evans*, 348.

Caules $2\frac{1}{2}$–6 poll. alti. *Folia* 4–9 lin. longa, $\frac{1}{4}$ lin. lata. *Pedicelli* 1–2 lin. longi. *Calycis lobi* $2\frac{1}{2}$ lin. longi. *Corolla* $4\frac{1}{2}$–5 lin. longa, 4 lin. diam.

237. **Erica Barbertona**, *Galpin* [Ericaceæ]; caules numerosi e rhizomate perenne annui, erecti, virgati, parce incani, brunnei, $3\frac{1}{2}$–6 poll. alti; folia 4na, imbricata, linearia, obtusa, marginibus revolutis supra convexa, subtus, sulcata, glabra, rigide glanduloso-ciliata, cum petiolis parum $\frac{1}{2}$ lin. longis, circa $2\frac{1}{2}$ lin. longa; internodia $1\frac{1}{2}$–2 lin. longa; flores terminales, umbellati, erecti, umbellis 3–6-floris; pedicelli calycibus paullo breviores, viscoso-pubescentes; bracteæ 2 (vel 3 ?) foliaceæ, obovatæ vel ovatæ, acutæ, ciliatæ, subremotæ; sepala inæqualia, lanceolata, acuta, rosea, setis rigidis glanduliferis obtecta; corolla calyce 4 plo longior, circa 4–$4\frac{1}{2}$ lin. longa, tubulosa, chartacea, rosea, extus dense viscoso-pubescens, ore aperto, limbo parvissimo ultra roseo, lobis reflexis late obtusis; genitalia inclusa, anthera basifixa, oblongo-lanceolata, glabra, biaristulata, aristis nudis subulatis; filamenta filiformia; stylus filamentis duplo longior, puberulus, filiformis, stigmate peltato; ovarium globosum, dense hirsutum.

Habitat.—Transvaal: Barberton, growing in tufts amongst stones and rocks in dry places on mountain summits, Upper Moodies and Saddleback Mountains, alt. 4500–5100 feet, September, *Galpin*, 598.

238. **Mimusops densiflora**, *Baker* [Sapotaceæ]; arborea, ramulis gracilibus glabris, foliis breviter petiolatis oblongis obtusis basi cuneatis magnis subcoriaceis utrinque viridibus glabris, cymis multifloris sessilibus confertis, pedicellis flore longioribus pubescentibus, calycis segmentis 6 ovatis æquilongis exterioribus subcariaceis ferrugineo-pubescentibus interioribus tenuioribus incanis, corollæ tubo brevissimo lobis oblongis calyce æquilongis, staminibus calyce æquilongis, ovario pubescente, stylo elongato glabro calyce longiore.

Habitat.—Interior of Western Lagos on Mount Ado, *Dr. Rowland.*

Folia, 4–6 poll. longa, 2–2½ poll. lata. *Calyx* et *corolla* 2 lin. longa. *Fructus* ignotus.

239. **Mimusops pachyclada**, *Baker* [Sapotaceæ]; arborea, foliis floribusque ad apicem ramorum crassorum aggregatis, foliis longe petiolatis anguste oblongis obtusis basi cuneatis rigide coriaceis adultis utrinque viridibus glabris junioribus pubescentibus venis primariis crebris subpatulis parallelis, floribus 8-meris, pedicellis pubescentibus flore 2–3-plo longioribus, calycis segmentis exterioribus ovato-oblongis dense brunneo-pubescentibus, corollæ tubo brevissimo lobis oblongis calyce paulo longioribus, staminibus calyce æquilongis, stylo protruso.

Habitat.—Savannahs of the interior of Western Lagos, *Dr. Rowland.*

Folia 4–5 poll. longa, 15–18 lin. lata. *Calyx* et *corolla* 3 lin. longa. *Fructus* ignotus.

240. **Mimusops capitata**, *Baker* [Sapotaceæ]; arborea, foliis floribusque ad apicem ramorum crassorum aggregatis, foliis longe petiolatis oblongis obtusis basi rotundatis rigide coriaceis utrinque viridibus glabris venis primariis prominentibus erecto-patentibus ad marginem parallelis, floribus 6-meris pluribus confertis capitatis, pedicellis dense pubescentibus flore longioribus, calycis segmentis ovatis æquilongis exterioribus dense brunneo-pubescentibus, corollæ tubo brevissimo lobis oblongis calyce æquilongis, staminibus calyce æquilongis, stylo exserto.

Habitat.—Interior of Western Lagos, *Dr. Rowland.*

Folia 6–7 poll. longa, 2½–3 poll. lata; petiolus 3–4 poll. longus. *Calyx* et *corolla* 3 lin. longa. *Fructus* ignotus.

241. **Mimusops longipes**, *Baker* [Sapotaceæ]; arborea, ramulis dense pubescentibus, foliis distincte petiolatis magnis oblongis acutis basi cuneatis subcoriaceis utrinque viridibus glabris cymis axillaribus sessilibus 3–6-floris, pedicellis flore longioribus dense pubescentibus, calycis segmentis 8 lanceolatis, exterioribus subcoriaceis dense pubescentibus incanis, corollæ tubo brevi lobis linearibus ex calyce haud protrusis, ovario dense piloso, stylo glabro elongato.

Habitat.—Interior of Western Lagos, *Dr. Rowland.*

Folia 4–6 poll. longa, medio 2–2½ poll. lata, petiolo pollicari. *Calyx* et *corolla* 4½–5 lin. longa. *Fructus* ignotus.

242. **Schizoglossum elingue**, *N.E. Brown* [Asclepiadeæ]; nanum, caulibus erectis patente pubescentibus, foliis 10–20 oppositis petiolatis quam internodia duplo longioribus oblongis subacutis vel obtusis basi subtruncatis levissime subauriculatis vel obtuse rotundatis utrinque pubescentibus marginibus revolutis, umbellis pedunculatis 4–8 floris, 1–3 ad apicem caulis corymbosis, pedunculis quam folia brevioribus, bracteis subulatis, pedicellis brevibus sepalisque lanceolatis acuminatis patente pubescentibus, corolla fere ad basin 5-loba lobis oblongis subobtusis albis breviter ciliatis extus marginibus sparse pubescentibus intus dense pubescentibus, coronæ lobis quam columna staminum duplo longioribus planis ovato-oblongis basi subcordatis vel truncato-rotundatis erectis apice recurvis 2–3 dentatis intus edentatis et ecarinatis albis.

Habitat.—Natal: on the slopes of the Drakensberg, 6000–7000 feet, January, *Evans*, 358.

Caules 3–6 poll. alti. *Foliorum petioli* 1–2½ lin. longi, laminæ ¾–2 poll. longæ, 2½–8 lin. latæ. *Pedunculi* 3–9 lin. longi. *Bracteæ* 1½–4 lin. longæ. *Pedicelli* 2–3½ lin longi. *Sepala* 2–3½ lin. longa, ⅔–¾ lin. lata. *Corollæ lobi* 3½–4 lin. longi, 1½–1¾ lin lati. *Coronæ lobi* 2–2⅓ lin. longi, basi 1 lin. lati, apice ½ lin. lati.

243. **Anisotoma pedunculata,** *N. E. Brown* [Asclepiadeæ]; undique pilis articulatis vestita, caule diffuso vel subscandente, foliis petiolatis cordatis vel rotundato-cordatis obtusis, cymis umbelliformibus 3–9-floris pedunculatis, bracteis parvis subulatis, pedicellis elongatis gracilibus, sepalis lanceolatis acutis, corolla profunde 5-loba subcampanulata lobis linearioblongis obtusis extus parce pilosis intus dense pubescentibus brunneis basi flavescentibus vel albidis, coronæ lobis quam columna staminum duplo longioribus erectis lineari-spathulatis minute hirtis apice conniventibus inferne dorso infra medium alato-carinatis et in dentem erectum productis, antheris apice barbatis, stylo apice depresso truncato quam antheræ multo breviore.

Habitat.—Natal: valleys of the Drakensberg, 6000—7000 feet, among grass, among and under boulders, January, *Evans*, 379.

Caules 1–2 ped. longi. *Foliorum petioli* 6 lin. longi, laminæ 10–16 lin. longæ, 8–16 lin. latæ. *Pedunculi* 9 lin.-2 poll. longi. *Pedicelli* 8–20 lin. longi. *Sepala* 1½ lin. longa. *Corollæ tubus* 1 lin. longus, lobi 1¾–2 lin. longi, ½ lin. lati. *Coronæ lobi* 1¼–1½ lin. longi, dente dorsali ⅓ lin. longo. *Staminum columna* ¾ lin. longa.

244. **Anthocleista insignis,** *Galpin* [Loganiaceæ]; arbor erecta, glaberrima, 70-pedalis vel ultra; folia decussata, coriacea, convexa, supra nitida, subtus pallidiora, oblonga, obovata, obtusa, basi anguste cuneata, magnitudine variabilissima in plantis juvenilibus maxima tanta quanta 4½ ped. longa, 15 poll. lata, costa subtus multum prominente, venis penninerviis subtus leviter elevatis, petiolis brevibus vagina connexis, stipulis nullis; cymæ 30–80-floræ, quadrangulares, striatæ, florentes circa 13 poll. longæ, fructantes circa 20 poll. longæ, bracteis bracteolisque concavis obtusis sub-cartilagineis; sepala valde imbricata, oblongo-orbiculata, margine scariosa, subundulata; corolla flaviscente-albida, calyce quadruplo longior, tubo 14–16½ lin. longo supra ovarium leviter constricto, limbo 1½–1¾ poll. expanso, lobis 10–13 anguste oblongis acutiusculis antheris duplo longioribus reflexis; stigma exsertum, crassum, oblonga leviter 2 fidum; ovarium 2-loculare, basi spurie 4-loculare; bacca viridis, fusiformis, 1¾ poll. longa, 13 lin. crassa; semina reniformia, rugosa.

Habitat.—Swaziland: Horo Forest, alt. 1800 feet. October 1890. *W. Leyson*, herb. Galpin, 1358.

245. **Strychnos alnifolia,** *Baker* [Loganiaceæ]; erecta, fruticosa, ecirrhosa, foliis breviter petiolatis obovato-oblongis obtusis basi cuneatis modice firmis utrinque viridibus glabris supra basin triplinerviis, cymis copiosis compositis laxis axillaribus sessilibus, calycis tubo brevissimo lobis orbicularibus pubescentibus valde imbricatis, corollæ tubo brevi lobis oblongis tubo duplo longioribus, genitalibus potalis brevioribus.

Habitat.—Interior of Western Lagos, *Dr. Rowland.*

Folia 2–2½ poll. longa, 12–15 lin. lata. *Calyx* 1 lin. longus. *Corolla* 3 lin. longus. *Fructus* ignotus.

246. **Diascia cordata,** *N. E. Brown* [Scrophularineæ]; caule erecto superne laxe ramoso quadrangulari glabro, foliis petiolatis ovatis obtusis basi cordatis vel subcordatis marginibus serrato-dentatis dentibus parvis utrinque glabris viridibus, floribus in racemos laxos terminales 3–15-floris dispositis, racemis sparse glanduloso-pubescentibus, bracteis alternis sessilibus vel subsessilibus ovatis acutis dentatis glabris quam pedicelli 2–5-plo brevioribus, pedicellis fructiferis deflexis et apice incurvis, sepalis lanceolatis acutis 2 inferioribus paulo longioribus, corolla rosea minute glanduloso-ciliata explanata rotundata subbilabiata longe bicalcarata, labio superiore 4-lobo disco bifossulato lobis rotundatis 2 superioribus minoribus, labio inferiore late ovato obtusissimo, staminibus omnibus antheriferis filamentis brevibus parce glanduliferis, ovario glabro, stylo brevi, capsula ovoidea vel ellipsoidea, seminibus reticulato-rugosis.

Habitat.—Natal: Drakensberg, Tiger Cave Valley, 6000–7000 feet, January, *Evans*, 382; Polela 4000–5000 feet, April, *Wood*, 4582.

Caules 1–2 ped. alti. *Foliorum petioli* 1–3 lin. longi, laminæ 6–15 lin. longæ, 4–11 lin. latæ. *Racemi* 1½–9 poll. longi. *Bracteæ* 1½–4 lin. longæ, 1–2½ lin. latæ. *Pedicelli* 6–11 lin. longi. *Sepala* 1½–2 lin. longa, ½ lin. lata. *Corolla* 8 lin. diam. *Calcaria* 3 lin. longa. *Capsula* 2–2½ lin. longa, 1½ lin. crassa.

247. **Diascia purpurea,** *N. E. Brown* [Scrophularineæ]; caule erecto basi decumbente quadrangulari glanduloso-pubescente, foliis breviter petiolatis ovatis vel rotundato-ovatis obtusis basi sub-cuneatis vel subrotundatis leviter dentatis vel subintegris supra viridibus sparse glanduloso-pubescentibus vel inferioribus glabris subtus violaceo-purpureis nervis sparse glanduloso-pubescentibus, floribus in racemum compactum bracteatum terminalem dispositis, plus minusve glanduloso-pubescentibus, bracteis ovatis acutis inferioribus dentatis, pedicellis bracteis æquilongis vel longioribus, sepalis 3 superioribus elliptico lanceolatis subacutis basi contractis, 2 inferioribus majoribus elliptico-ovatis acutis, corolla inæqualiter bilabiata basi breviter saccato-tubulosa breviter bicalcarata, labio superiore maximo 4-lobo lobis rotundatis disco ad medium valde intruso vel carinato et prope apicem concavo, labio inferiore brevissimo latissime rotundato, filamentis 2 anticis anantheris erectis 2 posticis antheriferis reclinatis, ovario glabro, stylo incurvo.

Habitat.—Natal: Drakensberg, Tiger Cave Valley, among grass, scarce, January, *Evans*, 377.

Caules 6–12 poll. alti. *Folia* 9–16 lin. longa, 5–12 lin. lata. *Bracteæ* 3–4 lin. longæ, 2–2½ lin. latæ. *Pedicelli* 4–6 lin. longi. *Sepala* 2 lin. longa, ½–1 lin. lata. *Corollæ labium superius* 6 lin. longum, 5–6 lin. latum, labium inferius 1 lin. longum, 3 lin. latum. *Calcaria* 1½ lin. longa.

248. **Lyperia grandiflora,** *Galpin* [Scrophularineæ]; fruticulus erectus, undique viscoso-pubescens, post siccitationem scabro-pubescens, 2–4 ped. altus; rami adscendente, foliosi; folia subfasciculata, petiolata, variabilia, nunc lanceolata nunc oblonga vel ovata, acuta vel obtusa, serrata, basi cuneata, subtus prominenti-nervosa, 12–16 lin. longa, 3½–5½ lin. lata; racemi terminales, fructiferi 4–7 poll. longi, pedicellis fructiferis rigidis 5–8 lin. longis; calycis fructiferi segmenta latiuscule linearia, 3¾–4¾ lin. longa; corollæ tubus pubescens, 11–14 lin. longus, calyce quadruplo longior, limbus planus lobis latis truncatis integris vel subemarginatis,

4½–7 lin. longis, capsula anguste ovata, acuta, valvulis cuspidatis, calycem æquans.

Habitat.—Transvaal: abundant amongst scrub on the hillsides and in the valleys around Barberton, flowering throughout the year, but chiefly in June and July, alt. 2200–3500 feet, *Galpin*, 394; *MacOwan and Bolus Herb. Norm.* 1329, near Lydenberg, *Atherstone*; margin of woods on the Drakensberg, near Macamac Gold Fields, *McLea*, *Herb. Bolus*, 3024; without locality, *Mrs. Saunders*, 193, *Herb. Wood*, 3897.

249. **Vitex thyrsiflora**, *Baker* [Verbenaceæ]; arborea, ramulis glabris, foliis longe petiolatis 5–foliolatis submembranaceis facie viridibus glabris dorso pallide viridibus obscure pubescentibus, foliolis obovato-oblongis integris cuspidatis, cymis in paniculam amplam terminalem dispositis, bracteis linearibus parvis, pedicellis brevibus pubescentibus, calycis tubo campanulato dentibus deltoideis parvis, corollæ tubo calyce duplo longiore lobis oblongis parvis, staminibus lobis brevioribus.

Habitat.—Interior of Western Lagos, *Dr. Harrison* (collected in the year 1863), *Dr. Rowland.*

Foliola 6–8 poll. longa, medio 3–3½ poll. lata, petiolo terminali pollicari. *Calyx* 1¼–1½ lin. longus. *Corolla* 3 lin. longa.

250. **Acrocephalus lagoensis**, *Baker* [Labiatæ]; perennis, caulibus erectis pubescentibus, foliis sessilibus linearibus denticulatis utrinque pubescentibus, capitulis parvis globosis in paniculam amplam ramis corymbosis dispositis, bracteis primariis ovatis parvis pallidis pubescentibus, bracteis floralibus dense pilosis orbicularibus, calyce dense piloso, corollæ tubo cylindrico sursum dilatato, labiis parvis oblongis, staminibus limbo longioribus.

Habitat.—Interior of Western Lagos, *Dr. Rowland.*

Caulis sesquipedalis et ultra. *Folia* majora 2–3 poll. longa, medio 3–4 lin. lata. *Capitula* 4 lin. diam. *Corollæ* tubus 2 lin. longus.

251. **Eucomis humilis**, *Baker* [Liliaceæ]; foliis oblongis firmulis obtusis dorso purpureo maculatis, scapo brevissimo subcylindrico, racemo densissimo oblongo foliis reductis oblongis purpureo-marginatis coronato, pedicellis brevissimis, bracteis magnis lanceolatis, perianthio campanulato basi et ad marginem segmentarum purpureo, staminibus perianthio distincte brevioribus filamentis purpureis, stylo ovario æquilongo.

Habitat.—Natal: top of Tabamhlope Mountain, alt. 6000–7000 feet, *M. S. Evans*, 398!

Folia semipedalia, 2½–3 poll. lata. *Perianthium* 6 lin. longum.

252. **Kniphofia Evansii**, *Baker* [Liliaceæ]; radice apice fibrosa, foliis productis anguste linearibus erectis subcoriaceis paucinervatis marginibus incrassatis integris, scapo foliis paulo longiore, racemo denso oblongo, pedicellis brevibus inferioribus cernuis, bracteis ovatis scariosis albidis pedicellis æquilongis, floribus splendide rubris siccitate atropurpureis, perianthio cylindrico lobis brevissimis obtusis, genitalibus inclusis.

Habitat.—Natal: on the Drakensberg, alt. 6000–7000 feet, *M. S. Evans*, 353.

Folia sesquipedalia, 1 lin. lata. *Scapus* 1½–2 pedalis. *Racemus* 2–3 poll. longus. *Perianthium* 6 lin. longum.

Near *K. gracilis*, Harv., and *K. pauciflora*, Baker (Bot. Mag. t. 7269).

253. **Aloe concinna**, *Baker* [Liliaceæ]; breviter caulescens, foliis sublaxe dispositis lanceolatis recurvis utrinque viridibus copiose conspicue albo maculatis haud lineatis aculeis marginalibus magnis crebris deltoideis, scapo simplici foliis paulo longiore deorsum compresso, racemo subdenso, pedicellis brevibus ascendentibus apice articulatis, bracteis parvis lanceolatis, perianthio cylindrico tubo brevissimo lobis elongatis, staminibus inclusis, stylo demum exserto.

Habitat.—Zanzibar: *Sir John Kirk*. Received alive at Kew in 1884. It flowered for the first time April 1895.

Folia 3–4 poll. longa, 1 poll. lata. *Racemus* 2 poll. longus, pedicellis bracteisque 3 lin. longis. *Perianthium* pollicare.

254. **Aloe (Eualoe) minima**, *Baker* [Liliaceæ]; acaulis, foliis 10–12 suberectis rosulatis multifariis anguste linearibus basi valde dilatatis facie canaliculatis copiose albo-maculatis aculeis marginalibus crebris patulis albis lanceolatis, scapo simplici bracteis vacuis pluribus prædito, floribus dense racemosis, pedicellis ascendentibus, bracteis ovato-acuminatis magnis, perianthio cylindrico pallide rubello tubo brevissimo segmentis elongatis, genitalibus inclusis.

Habitat.—Natal: solitary amongst grass on the South Downs, *M. S. Evans*, 409.

Folia 5–8 poll. longa, supra basin 1½ lin. lata. *Scapus* 6–12 poll. longus. *Pedicelli* 3–6 lin. longi. *Perianthium* 4½ lin. longum.

255. **Ornithogalum (Caruelia) diphyllum**, *Baker* [Liliaceæ]; bulbo parvo globoso tunicis exterioribus membranaceis pallidis, foliis sæpissime binis linearibus glabris erectis, scapo foliis æquilongo, floribus sæpissime 2 erectis, pedicellis brevibus ascendentibus, bracteis lanceolatis, perianthio campanulato albo segmentis oblongis concoloribus imbricatis, staminibus perianthio duplo brevioribus filamentis linearibus conformibus, ovario globoso, stylo brevissimo.

Habitat.—Natal: summit of Tabamhlope Mountain, alt. 6000–7000 feet, *M. S. Evans*, 374.

Bulbus 3 lin. diam. *Folia* 1½–2 poll. longa, 1 lin. lata. *Perianthium* 3 lin. longum.

256. **Albuca (Falconera) humilis**, *Baker* [Liliaceæ]; bulbo ovoideo tunicis exterioribus membranaceis, foliis 3 anguste linearibus erectis glabris, scapo brevi, floribus 2–3 corymbosis pedicellis erecto-patentibus, bracteis parvis lanceolatis vel ovato-acuminatis, perianthio campanulato segmentis oblongis albis medio rubro-brunneis, staminibus omnibus antheriferis, stylo triquetro ovario æquilongo.

Habitat.—Natal: wet rocks at the top of Tabamhlope Mountain, alt. 6000–7000 feet, *M. S. Evans*, 361.

Bulbus 4–6 lin. diam. *Folia* 3–6 poll. longa, 4–6 poll. lata. *Perianthium* 6 lin. longum.

CCCCLXV.—SIAM BENZOIN.

Benzoin is also known in English commerce as Gum Benjamin. It is a gum-resin obtained by incision in the bark of trees in Sumatra and Siam. Benzoin is used as a stimulant and expectorant in chronic bronchitis. It is also one of the principal ingredients in Friar's Balsam, and is largely used for incense.

Sumatra benzoin is yielded by *Styrax Benzoin*, Dry., a well-known tree. Plants of this species are under cultivation at Kew, and many have lately been distributed to botanical establishments in the tropics of the New World. Of the tree yielding Siam benzoin we know very little. As long ago as 1865, Sir R. H. Schomburgk, when British Consul at Bangkok, was asked to investigate the subject, but although able to give, at second hand, a very interesting account of the mode of collecting the resin, he was unable to obtain botanical specimens of the tree yielding it. Of late years renewed efforts have been made to solve the problem.

Captain Hicks, of Bangkok, was successful in obtaining a few small plants of "gum benjamin from the Northern Laos States" in 1882. The survivors of these were presented to the Botanic Gardens at Singapore by Mr. Jamie. A fuller account of Captain Hicks' efforts is given by Mr. E. M. Holmes, F.L.S., in the *Pharmaceutical Journal*, XIV. [3], p. 355. The locality from which the plants were obtained was given as "Suang Rabang." This, we now know, is a misprint for Luang Prabang, a district in the extreme north-east of the Shan States of Siam, bordering on Tran Ninh, in the French territory of Anam. In the hope that the Siam benzoin tree might possibly extend to the Shan States of Burma, an application was addressed by Kew to the India Office in 1889, and as a result a careful inquiry was made by the Government of India in Tennaserim, Upper Burma, and the adjoining Shan States. In 1890 it was reported that "the efforts made to trace the existence of the plant in those localities have been unsuccessful."

Apparently, the first authentic information respecting the district in which the tree is to be found is contained in a recent Report by Mr. Beckett, forwarded to the Foreign Office by Mr. de Bunsen on the Trade of Siam for 1893 (Foreign Office, Annual Series, 1895, No. 1520). The following extract shows that Siam benzoin is obtained from an extremely circumscribed locality on the east bank of the River Mekong, in territory now occupied by the French. It is feared that the trade in this article will be ultimately diverted to Tonquin, which is nearer to the source of supply than Bangkok:—

"*Gum-benjamin.*—Of gum-benjamin, 319 piculs, or nearly 20 tons, figure in the export list, valued at 21,005 dollars, or 2713*l*. This valuable resin is also a product of the east bank of the Mekong, and is interesting as being confined to a narrow zone of forest-clad hill country to the east of Luang Prabang, lying between 19th and 21st degrees of north latitude and longitude east 102 to 105. Some three-fifths finds its way to Bangkok by way of Nan, and the remainder by way of Nongkhai and Korat. The French occupation of Luang Prabang does not seem as yet to have caused any perceptible effect on the Bangkok export of gum-benjamin beyond enhancing local prices, but with the completion of new roads, already initiated by the French with a view to speedier communication between Luang Prabang and Tonquin, Bangkok exporters, who are chiefly British, have well-founded fears lest the gum-benjamin trade be diverted entirely from Bangkok to Hanoi. The whole of the Bangkok export goes to the London market

and thence to France and Belgium, to be manipulated into balsam. A small quantity is used locally for frankincense.

"Prices during 1893 were bad, first class gum-benjamin fetching 125 ticals per picul (or about 165*l.* per ton), and the second class, 45 ticals per picul (about 40*l.* per ton). The good quality known to buyers as 'bold blocky almondy' was scarce."

CCCCLXVI.—MISCELLANEOUS NOTES.

Mr. Charles Henry Humphries, in the employ of the Royal Gardens, has been appointed by the Secretary of State for the Colonies Curator of the Botanic Station at Aburi, on the Gold Coast, in succession to the late Mr. William Crowther. Mr. Humphries entered the Royal Gardens in January 1892, having previously spent nearly nine years with Messrs. Kelway & Son, at Langport, Somerset. He had three years' experience in the tropical department at Kew, and attained to the rank of sub-foreman. He holds certificates for lectures in Elementary Physics and Chemistry, Organography and Systematic Botany, and Economic Botany.

Mr. Hugh McMillan, in the employ of the Royal Gardens, has been appointed by the Secretary of State for the Colonies, on the recomendation of Kew, Head Gardener of the Royal Botanic Gardens at Peradeniya, Ceylon. Mr. McMillan entered the Royal Gardens on the 21st August 1893. He had previously served at Cyfartha Castle and Cardiff Castle Gardens in South Wales. He has diligently attended the course of lectures at Kew, and holds certificates in five subjects, including British Botany.

Mr. John Chisnall Moore, in the employ of the Royal Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Curator of the Botanic Station at St. Lucia, in the Windward Islands, West Indies. Mr. Moore entered the Royal Gardens in December 1893. He was previously employed at Broadlands, Hants., the seat of the Right Honourable Evelyn Ashley. He holds certificates for attendance at lectures at Kew in Economic Botany, Organography, and Systematic Botany, and Geographical Botany.

Large Cacti.—The Royal Gardens are indebted to Professor James W. Toumey, of the University of Arizona, for a collection of large Cacti from that region. Amongst them are two specimens of *Cereus giganteus*, each 9 feet high and weighing 4 cwt. A still larger specimen of this may be seen in the Palm House, its height being 15 feet, and its weight about 9 cwt. This was purchased from a Californian nurseryman in 1890. It flowered in the year following, and a figure of it was published in the *Botanical Magazine*, t. 7222. Other large specimens among the recent arrivals are two of *Echinocactus Wislizeni*, each 6 feet high and weighing 4 cwt. Judging by the slow rate of growth of smaller examples of this species, which have been at Kew 10 years, these two large plants must be of very great age, probably hundreds of

years. This species is remarkable for its bulky stems. The specimens are 2 feet in diameter, and armed with stout hooked spines, resembling strong jack hooks. There are also two large specimens of *Opuntia arborescens*, remarkable for its long spines, each enclosed in a loose pale yellow sheath; two equally large of *O. fulgida*, peculiar in the downward or "weeping" growth of its branches; two of *O. arbuscula* and three small plants of the new *Cereus Pringlei*, an ally of *C. giganteus*. These plants are at present grouped in the centre of the Succulent House (No. 5).

Botanical Magazine.—The plants figured in the May number are: *Kniphofia Northiæ*, *Vaccinium erythrocarpum*, *Argylia canescens*, *Veronica Hectori*, and *Cypripedium Charlesworthii*. With the exception of the *Veronica*, they were all drawn from plants that flowered at Kew. The *Kniphofia* was brought from Grahamstown, Cape Colony, to Kew in 1883 by Miss Marianne North, after whom it was named. With slight protection it bears our winters, and last year flowered freely in the open air at Kew in June. It is a vigorous caulescent species, resembling an *Aloe*, and there is a painting of it in the North Gallery, n. 367. *Vaccinium erythrocarpum* is a pretty North American hardy species, the berries being nearly black when ripe. *Argylia canescens* (Bignoniaceæ) is a member of an exclusively Andean genus. It has a thick caudex from which slender annual flowering stems are produced. The Kew plant was presented by T. King, Esq., of Garnett Hill, Glasgow. *Veronica Hectori* is a New Zealand species of the group, having small closely imbricated leaves like a cypress. It was drawn from a specimen communicated by Dr. Balfour, Regius Keeper of the Edinburgh Botanic Garden. The plant of *Cypripedium Charlesworthii* figured was purchased at an auction sale. It is an ornamental species inhabiting the Shan Hills, Upper Burma—not the province of Aracan, Bengal, as stated in the Magazine.

All the plants figured in the June number were drawn from specimens cultivated at Kew. *Crinum Schimperi* is a handsome Abyssinian species, received at Kew both from the Berlin Botanic Garden and Mr. Max Leichtlin of Baden-Baden. *Trichocladus grandiflorus* belongs to an exclusively South African genus of the Hamamelideæ. It was raised from seeds communicated in 1890 by Mr. E. E. Galpin of Queenstown, Cape Colony, and flowered in the Temperate House for the first time in 1894. *Ribes bracteosum* is a striking species discovered by David Douglas in 1826, at the mouth of the Columbia River in Oregon. The history of its introduction to Kew is unknown, and it does not appear to be in cultivation elsewhere in this country. *Peraphyllum ramosissimum*, from the same region as the last, has been in cultivation at Kew for upwards of 20 years, but was never known to flower till 1894; a season to be remembered for the many plants that produced flowers the first time here, in consequence of the unusual amount of sunshine during the previous summer and autumn. It is a member of the Pomaceæ, and closely allied to *Amelanchier*. The last is *Rosa Luciæ*, a pretty white-flowered prostrate species, native of Japan, which was presented to Kew by Professor Sargent, Director of the Harvard Arboretum, Boston, U.S.A., under the name of *R. wichuriana*.

Donation of Books.—The Misses Case of Heath Brow Cottage, Hampstead, have presented 16 volumes of botanical books to Kew,

chiefly relating to British plants, and consisting mainly of different editions of works by authors already represented in the library. Among them Bingley, J. Donn, Knapp, Lees, and Withering.

Kniphof's Botanica in Originali, seu Herbarium Vivum, 1758–1764.—The name Kniphof, as commemorated in the genus *Kniphofia*, is not unfamiliar, but comparatively few persons will know anything of the history of the man who was the author of the work of which the above is the abbreviated title. An uncut copy of this rare and curious botanical book has lately been added to the Kew library. It is interesting historically, both on account of its being a record of plants cultivated at that date in Germany, and chiefly, in all probability, at Erfurt, as it was there the author resided, and also on account of its being one of the earliest, if not actually the first, work of considerable extent, in which the process of nature-printing was employed to illustrate plants. It would appear that D. Brükmann, a contemporary of Kniphof, was really the inventor, if it may be so termed, of this method of representing plants, as there is a published letter by him on the subject addressed to Kniphof, dated 1733; but this is not in the Kew library. The title is: *Sendschreiben an* J. H. Kniphof, *die Art die Kräuter nach dem Leben abzudrucken und also compendiöse Herbaria picta zu machen, vorstellend.* The full title of the work in question is: Botanica in Originali seu Herbarium Vivum in quo Plantarum tam Indigenarum quam Exoticarum peculiari quadam operosaque enchiresi atramento impressorio obductarum Nominibusque suis ad Methodum Illustrium nostri aevi Botanicorum Linnaei et Ludwigii Insignitarum elegantissima ectypa exhibentur. Opera et Studio Joannis Godofredi Trampe.

There are two foolscap folio volumes containing 1202 figures, one on each leaf, besides a number introduced on the title pages of the 12 parts in which it was issued, for the purposes of embellishment, making a total of 1250 species represented. Figure 545 is missing. The Kew copy is probably unique in being coloured, the colouring being most likely the work of a private person, for there is no mention of coloured copies by any of the bibliographers. The colouring is generally well and effectively done, though in some instances it is to some extent neutralised by the too intense blackness of the print. This copy first belonged to J. G. Menn, M.D., Professor Publicus Primarius at Cologne, who seems to have acquired it in 1764, the date of the publication of the last part. Subsequently it must have passed into English hands, as some person has written, in a very neat hand, the English names of many of the plants.

The arrangement is alphabetical, with the Linnean names of the first edition of the *Species Plantarum*, and references to the pages of that work, as well as the *Systema*, and Ludwig's *Definitiones Generum Plantarum*. The "specific phrases" of the *Species Plantarum* are also reproduced.

Indian Plants.—The Rev. R. Huter, of Sterzing, Austrian Tyrol, has presented a collection of dried plants, made by Hieronymus Rastler, a missionary, near Bethia, North Behar, and on the Nepal frontier. It consists of about 450 species, including a few new ones.

Natal Plants.—Mr. J. Medley Wood, A.L.S., Curator of the Natal Botanic Garden, has presented a further small parcel of dried plants of great interest.

Plants of the Milanji Hills.—Mr. H. H. Johnston, C.B., Commissioner and Consul-General in British Central Africa, has transmitted a small collection of dried plants, made by Mr. J. McClounie, together with a few seeds. Most of the plants are the same as those collected by Mr. Whyte, and published in the *Transactions of the Linnean Society* (Botany, 2nd series, vol. iv., pt. 1, pp. 1–68, tt. 1–10), but they include a number of which Kew did not previously possess any Herbarium specimens, notably the cypress, *Widdringtonia Whytei*. There are also three or four apparently undescribed species, of which the material in some instances is insufficient for description.

Flora of British Somali-land.—Miss Edith Cole and Mrs. Lort Phillips and party made a journey in this country last winter and early spring, and collected and dried about 300 species of flowering plants and a few ferns, which they have generously presented to Kew. The country traversed was from Berbera to the Golis range of hills, which rise to a height of 5000 feet. In view of the comparatively recent partial botanical investigation of the island of Socotra, and Mr. Bent's collections from Southern Arabia, together with the fact that little is known of the flora of Somali-land, some highly interesting results are expected from the working-out of these ladies' collections. The Acanthaceæ, especially, are very strongly represented; there is a new fern; and the three orchids include an apparently new species of *Epipactis*, a genus not previously known to inhabit tropical Africa, though we believe Mr. Scott Elliot also collected a species in the Ruwenzori mountains. Miss Cole also collected and presented to Kew plants of a species of *Eulophia*, a *Dracæna*, various bulbs, and 20 packets of seeds.

Anthocleista insignis.—Mr. E. E. Galpin, of Queenstown, South Africa, whose description of this tree is given at p. 150, sends the following note respecting it:—

This handsome tree is abundant in the Horo forest and yields a very useful timber. The wood is white, soft, easily worked, and, I believe, hardens with age. Being very even grained it is not liable to split, and was used for making the bodies of the ore trucks required for the Horo mine, for which purpose it proved itself to be admirably adapted. The young trees shoot up to a height of 30 feet or more without a branch, and, bearing at their summit a cluster of magnificent leaves which are considerably larger than those borne by the mature trees, and give the tree a somewhat palm-like appearance. Not having an opportunity of visiting the locality during the flowering season, I am indebted to Mr. William Leyson, the courteous manager of the Horo Concession, for a fine series of flowering and fruiting specimens, which were only to be got at by felling the trees bearing them. [A plant is growing at Kew].

Dried Plants from South Arabia.—Mr. J. Theodore Bent has returned from a second journey in Arabia Felix, bringing with him a collection of dried plants, made by himself, and generously presented to

Kew. The parts visited by Mr. Bent on this occasion were the neighbourhood of Muscat, and the hilly region near Merbat, a little westward of the Kuriyan-Muriyan Islands. Almost all of the plants, about 250 in number, were collected at the latter place, in the Dhofar mountains, which rise to a height of about 3000 feet. Mr. Bent avoided collecting plants he recognised as having been collected by Mr. Lunt, who accompanied him on his visit to the Hadramaut country, which was a pity, because many of them are very rare, or at least only represented in herbaria by Lunt's specimens. He also eschewed the common coast plants and weeds of cultivation, which was more to the purpose. This collection is not so rich in novelties as the previous one, containing no new generic type, though nearly a score of the species appear to be undescribed. It manifestly illustrates the westward extensions of types common to Baluchistan and Sind. A very distinct wild cotton, *Gossypium Stocksii*, is a noteworthy example. It had previously only been found in Sind, and some authorities have regarded it as one of the wild progenitors of cultivated cotton. Merbat is near the centre of the Arabian Frankincense country, and Mr. Bent obtained good specimens of the true plant, *Boswellia Carteri*, Birdw., as well as one of the Myrrhs, *Balsamodendron Opobalsamum*. Mr. Bent has exhibited a selection of his plants both at the Royal Geographical Society and Royal Society.

The Flora of the Solomon Islands.—Since the preceding paper (p. 132) on Mr. Comins's plants was put into type, Kew has received, through Rear-Admiral Wharton, C.B., Hydrographer to the Admiralty, another small collection of dried plants and a box of orchids from this interesting group of islands, made by the officers of H.M.S. "Penguin," Commander A. F. Balfour. There are several probably undescribed plants, including two species of *Begonia*, a very handsome *Eugenia*, a *Myristica*, some Scitamineæ, and orchids. The curious *Lepinia taitensis* was found in the island of New Georgia, where indeed most of the plants appear to have been collected; and the seeds appear to be good. There are also good seeds of *Cominsia Guppyi*, Hemsl., a singular member of the Scitamineæ figured in the *Annals of Botany*, v. t. 27. But the most important part of the collection consists of leaves, female inflorescence, and seeds of the *Sararanga sinuosa*, Hemsl., (Pandanaceæ) described and figured from very imperfect materials in the *Journal of the Linnean Society*, xxx., p. 216. t. 11. There are also photographs showing the habit of the tree, and Lieutenants B. T. Somerville and S. C. Weigall communicated the following description and particulars of this very distinct screw-pine.

"In New Georgia, Solomon Islands, it was found growing exclusively at the estuaries of rivers, never in very large quantities, and generally in clumps of three or four. The natives say that it does not grow on the hill tops, but only in such positions as we found it, close to the water; and that it is not very common anywhere. Their name for it on the Northern coast is '*Ndalú*,' while at Rubiana, on the Southern side of New Georgia, it is called '*Pate*.'

It is said by the natives of Savo Island to exist there also.

"The average height of a full grown tree is 60 feet, including the branches, which radiate out from the stem at the top of the trunk only, to a length of about 10 feet.

"One specimen, growing on a small point of river boulders and sand, affording but poor nourishment and root-hold, had the lower part of the trunk to a height of 6 feet from the ground, enclosed in a thick covering of small tendril-like roots, closely adhering together, and tightly packed in to the tree, following its contour, giving the appearance of a sudden thickening of the bark. A specimen is enclosed of these rootlets. There were no aerial roots in any instance. The tree is in flower between October and January; though these months probably do not represent the limits between which this occurs.

"The flower head grows in the centre of the leaf-branches, which themselves occur at the end of the large branches radiating from the head of the trunk. It consists of a tough main stem, strongly bent at the foot, so as to cause the flower head to hang downwards, from which spring 30 flower-branchlets diminishing in size to the point, which forms a branch itself. They grow two in opposition, followed by two more in opposition, but placed on the opposite diameter of the main stem.

"The lowest, largest flower-branchlet had 16 minor branches springing from it, growing irregularly both in distance and position, and bearing 162 blossoms.

"When first cut down the blossoms had a faint fetid odour like that of a harvest-bug, which, however, soon passed off.

"The following measurements of the flower-head were made:—

Extreme length from base of stem to tip { 45 inches / 60 „ } Two specimens.

Girth of stem at lowest flower branch	4½ inches
Distance between two flower branchlets	3½ „
Length of first flower branchlet	11 „
Length of last flower branchlet	4¾ „
Length of head branchlet	7¼ „

"The distinguishing feature of the leaves of this species is that there are no spines or thorns on the edges, or mid-ribs for the greater part of their length. The species already described from Fauro Island, by Surgeon Guppy, appears to have had only a few at the very point. In the New Georgian variety, as will be seen, there are spines for a short distance from the base of the leaf upward, and from the point of the leaf downward, continuing farther still down the mid-rib.

"The leaves grow in clumps at the end of the boughs, their bases following one another in the form of a screw-thread. There were 29 leaves in one average-sized bunch that was counted.

"The following averages were made from the measurements of three fully matured leaves:—

	Ft.	in.
Whole length of leaf about	7	10
Distance from base, bearing spines on the edges	2	0
Intermediate space, clear of spines	5	0
Distance from point bearing spines on the edges	0	10½
„ „ „ mid-rib	2	8

The point of the leaf is shaped like a bayonet, and is usually brown, except in the younger leaves."

(Signed) Boyle T. Somerville, Lieut. R.N.
S. Weigall, Lieut. R.N.

The foregoing particulars are valuable, and, together with the specimens will permit of a more complete description of the plant than has

hitherto been published. Unfortunately, the male inflorescence and flowers are still unknown. There is no doubt, however, in spite of little discrepancies in the descriptions, and the fact that Mr. Guppy met with the tree only at the summit of Fauro Island (at an elevation of 1600 to 1900 feet), that one and the same species inhabits the two very different situations indicated. On consulting Guppy's work (*The Solomon Islands*, p. 288) in relation to this question, it was found that he mentions a species of *Begonia* being common on the slopes of the hills of Fauro Island, though there was no specimen in the collection he presented to Kew.

The box of orchids mentioned above was a disappointment, most of the plants being dead, owing to excessive dryness. A *Dendrobium*, *Cœlogyne*, and *Grammatophyllum* may be saved.

Date Cultivation in South Australia.—On the motion of the Hon. R. A. Tarlton, a report was presented to the Legislative Council of South Australia recommending the cultivation of the Date Palm in the Far North districts in 1884. Since that time the Woods and Forests Department has given special attention to the subject. The principal operations were carried on near Hergott Springs. In June 1891, there were 13 plants four years old, 285 one year old, and 53 just planted out. All had been raised from seed. The largest plants were from 3 feet to 4 feet high. Suckers were subsequently obtained from Kurrachee through the agency of Afghans bringing camels to the Colony. In the *Report* of the Woods and Forests Department for 1892–93 it is stated: "The results attending the cultivation of the date palm at Hergott Springs have been very gratifying . . . . The 13 older seedling palms are now 6 feet to 10 feet high, and the younger ones are growing at an equally vigorous rate. The most encouraging feature is the successful ripening of a good-sized bunch of dates of very fair quality on a palm planted barely six years ago." A male palm flowered in August and a female palm in September following. The latter was artificially fertilized, and in 158 days' time the ripe fruit was gathered. "It was not expected that this fruit would be of superior quality, seeing that it was produced by a seedling palm from seed of unknown kind. . . . The dates were, however, pronounced to be of fair marketable quality, and their perfect maturity affords definite proof of the possibilities open to date culture in the South Australian interior." In the *Report* for 1893–94, just to hand, further particulars are given: "The older palms are from 6 feet to 11 feet in height . . . nine of them have flowered; of these, six were male and three female palms." The bunches produced weighed respectively $2\frac{1}{4}$ lbs. and $7\frac{3}{4}$ lbs. "It is interesting to note that one of these bunches was fertilized by pollen from a freshly cut male spadix, and the other by pollen from a male spadix which had been kept for six weeks in a box. In each instance the operation was most successful, hardly a date failing to mature." Suckers of the celebrated "Deglet Nour" date palms from Algeria, 50 in number, have this year been received at Adelaide. They were obtained through the courtesy of the French Governor-General from proprietors at Biskra, whose plantations are renowned for the superior quality of the fruit. The suckers were carefully tended at the experimental garden at Hamma, and shipped by way of Marseilles. They arrived in South Australia in excellent condition. A similar

consignment was received at Sydney for the Government of New South Wales. In Queensland efforts are also being made to establish date cultivation. The late Dr. Bancroft exhibited samples of dates grown in Queensland at a meeting of the Acclimatisation Society in May 1893.

Orthezia insignis.—The *Tropical Agriculturist* for January 1895 contains a paper by Mr. E. E. Green, of Ceylon, on "an important Insect Enemy." From this article the following extracts are taken :—

"In Dr. Trimen's Annual Report on the Botanical Gardens for 1893, mention was made of the occurrence in the Peradeniya Gardens of a serious insect-pest which was most destructive to the ornamental shrubs there. As this pest has been increasing very rapidly and has already spread beyond the limits of the Gardens, it is important that general attention should be drawn to it.

"Within the Peradeniya Gardens efforts are being made to keep it in check, but it has appeared on Lantana in the neighbourhood, and there is no knowing where it will stop. It has, fortunately, as yet shown no taste for either of our two most important products, tea and cacao. Coffee, however, does not share this immunity, for trees of Liberian coffee have been observed to be infested with the insect, and we have no reason to suppose that the Arabian species will be less liable to attack.

"Dr. Trimen is of opinion that this is mainly a garden pest, and does not expect that it will spread to estates. It is to be hoped that this prediction will prove correct, but it would be unwise to ignore the fact that, if unchecked, the pest might spread enormously and might possibly develop a taste for other plants, as was the case with the 'Fluted Scale' (*Icerya Purchasi*), which, at first practically confined to acacia and orange trees, finally became almost omnivorous" (p. 437).

* * * *

"The insect is known to entomologists by the name of *Orthezia insignis*, Douglas, being first described by Mr. J. W. Douglas from specimens found in Kew Gardens, where it is now said to be doing an enormous amount of damage in the plant houses. It has more recently been figured and described by Mr. Buckton under the name of *Orthezia nacrea* (*Indian Museum Notes*, Vol. III., No. 3, p. 103). The specimens submitted to Mr. Buckton were unfortunately damaged in transit; his figures are consequently not very satisfactory. Comparison with specimens from Kew proves the two insects to be specifically identical.

"Originating as it does in the Peradeniya Botanical Gardens, there is little doubt but that we owe the introduction of this pest to plants received from Kew. Its native country has not been determined" (p. 437).

Mr. Green's statement as to "the enormous amount of damage in the plant-houses" caused by the insect is very much exaggerated, and I am unable to ascertain the authority on which it is made. Mr. Buckton, in *Indian Museum Notes* (l.c. p. 104) says :—"The Kew insect appears to be spreading over the hot-houses of England, and seems to be very difficult to annihilate. It does as much mischief as the more common 'mealy bug.'"

Orthezia insignis was first described in the Entomologist's Monthly Magazine for January 1888. Mr. Douglas says:—"In August Mr. Edward T. Browne, Uxbridge Lodge, Shepherd's Bush, sent me several examples of this species, which he had obtained in the Royal Gardens at Kew, requesting that I would describe it if new, and he added the following particulars:—'First found on *Strobilanthes*, a Chinese plant, which has been in the Economic House three years; it may now be seen in the adjoining house on other foreign plants.'"

The Assistant Curator has furnished the following report on the subject:—

"The Chinese *Strobilanthes* referred to is *S. flaccidifolius*, Nees (*Bot. Mag.* t. 6947), which was received from Hong Kong in May 1886. This plant is not much affected by the *Orthezia*, whereas *S. gossypinus* and *S. cuspidatus*, two Indian species introduced by means of seeds received from Ootacamund in 1887, have been much subject to it, as also are other species of *Strobilanthes* from India and Ceylon. The only other plants upon which the *Orthezia* appears to thrive are *Manettia bicolor* and *Streptocarpus*. No appreciable harm is done to the plants by the *Orthezia*, even when they are badly infested. It is the least harmful of all the insects parasitical on plants at Kew. It has been noticed in the tropical houses for about ten years, but we cannot trace its source."

In *Timehri* (vol. iii. new ser., 1889, p. 308) Mr. S. J. McIntire figures the *Orthezia* with the remark:—"Noticed as a stranger among the plant vermin of Kew Gardens, into which place, we now know, it must have been introduced upon some plant from British Guiana."

In *Timehri* (vol. iv., 1890, p. 304) Mr. R. Ward gives the following account of the habits of the *Orthezia*:—"This pest affects many plants, especially those that are herbaceous or soft in texture. . . . Although common, it is not nearly so destructive or troublesome as many of its allies. In the young state it is very abundant; after it becomes fully developed it is more easily preyed upon by its natural enemies, which play an important part in limiting its ravages. In this respect no insects are more assiduous than the grubs of the different species of *Coccinella*, *Syrphas*, the various *Hemerobidæ*, of which the different species of *Chrysopha* act a chief part."

Mr. Ward was appointed to the Botanic Gardens in Demerara from Kew in 1886. He does not say if his observations were made on the insect in Demerara. It may, however, be presumed that they were, and that he had known the *Orthezia* for some time.

As far as Kew is concerned, the *Orthezia* is rather a scientific curiosity than a troublesome pest.

The dispersion of plant diseases through the interchange of plants is undoubtedly a peril requiring careful precautions. The *Phylloxera* was introduced from England into Switzerland. The Coffee-leaf disease (*Hemileia*) has been conveyed from Ceylon on the one hand to Fiji (with tea seeds), where it practically extinguished the promising coffee industry, and to German East Africa on the other. It has always been a matter of the deepest anxiety lest by any accident it should be introduced through Kew to the New World, where it does not at present exist. It has been no less a matter of anxiety lest the Coffee-leaf miner should be introduced into the Old World. Kew extends, undoubtedly, an involuntary hospitality to many strange guests, which come unbidden, no one knows whence. The remarkable land Planarian, described by the late Professor Moseley as *Bipalium Kewense*, which is generally to be found in the houses, is a case in point.

It is undoubtedly possible that the *Orthezia* may have reached Ceylon by way of Kew. It is not, however, very probable, and the reverse may just as well have been the case. It exists in the public exhibitions, however, from which plants are not drawn for exportation. The plants in the propagating houses from which distribution is made are kept scrupulously clean, and every precaution is taken to send them out free from taint of any sort or kind.

Niger Coast Protectorate.—In a Report on the Administration of the Niger Coast Protectorate, presented to the Foreign Office, for the years 1891–94, pp. 5 and 6, Sir Claude MacDonald, K.C.M.G., gives the following interesting account of the efforts made to establish a Botanic Station and develop the resources of the extensive territory under his charge :—

"It will be seen on perusing my brief remarks on the subject of the trade of the district, that the principal, and, by comparison, the only article of export is derived from the fruit of the palm tree *Elæis guineensis*. I have frequently pointed this out to the native trader, and have endeavoured to rouse him to the fact that his country produces other articles which, from a commercial point of view, are more valuable even than palm oil. The native trader is, however, difficult to move and very conservative. What was good enough for his father is good enough for him. There are, however, some notable exceptions to this rule, and one or two of the native chiefs are waking up to the advantages of trading in articles other than palm oil. To the end that every encouragement may be given to the cultivation and collection of various natural products, a botanic station has been started at Old Calabar. I enclose a Report by Mr. Horace Billington, Curator of the Station, showing what work has been done on the station, as also a report by him on the botany of the country lying to the eastward of the Old Calabar River, and a similar report of the banks of the Cross River. By my instructions, Mr. Billington has drawn up a very useful little pamphlet, which has been translated into Efik, the native language of Old Calabar, and distributed gratis to the chiefs in this river, and to some in the others, giving useful rules and hints respecting the growing of coffee and cacao. To further encourage this industry, free gifts of young coffee plants are made to chiefs who will clear the ground for their reception, and as the plant does not bear until its fourth year, a small grant is made yearly for each plant alive and healthy at the end of the third year. When the plant begins to bear the grant ceases, and the plant then becomes the property of the planter, and begins to pay for itself. The export of coffee from the Protectorate was in the first year of the new Administration 2798 lbs.; in the second year 28,099 lbs. The export of cacao in the first year was 21,760 lbs.; and in the second year 51,299 lbs. When, therefore, the natives begin to learn the lessons taught by the botanic garden, I anticipate a large increase in the export of this as well as other and new products. It will be seen in the Curator's Report that the garden has been visited by several native chiefs, who have shown an intelligent interest in the same. Mr. Billington is a most enthusiastic and painstaking official."

Cultural Industries at the Gold Coast.—The following extract is taken from the Report on the Gold Coast for the year 1893, lately published by the Colonial Office. [Annual Series, 1895, No. 136] :—

"The only important advance which has been made in the cultivation of plants of economic value has been with respect to coffee. Several additional coffee plantations of small size have been started by the natives in the country of Akwapim, and the larger plantations in the neighbourhood of Cape Coast, more especially that owned by the Glasgow firm of Messrs. Miller Brothers and Company, are beginning to produce the coffee berry in paying quantities. It will be seen on referring to the table of exports, that the export of coffee has increased from 12,899 lbs. in 1892 to 21,437 lbs. in 1893.

"It is satisfactory to note that the export of kola-nuts has increased, the value in 1892 being 1328*l.* 7*s.* 3*d.*, whereas it was 25,716*l.* 5*s.* 7*d.* in 1893. I stated in my report for 1892 that more would be heard of kola-nuts as an article of export, and there is every reason to suppose that attention is now being given to this valuable commercial product, which is to be found in large quantities in the hinterland of the Gold Coast.

"The trade in rubber was very good, as the following comparison with the trade in 1892 shows :—

	Weight.	Value.
	lbs.	£ *s.* *d.*
1892 - - - - -	2,663,020	166,659 16 8
1893 - - - -	3,395,990	218,162 8 3

"A good deal of general work has been done in the Government botanical station during the year and considerable attention has been paid to the plantations of coffee and cacao, in the cultivation of both of which, but more especially the former, the natives appear to have become interested. Along the road leading from the botanical station through the country of Akwapim to the interior are large numbers of small clearings in which coffee plants, chiefly obtained by purchase from the botanical station, are to be seen in a most flourishing condition. The Liberian coffee plant appears to thrive best, but there are large quantities also of the Arabian coffee plant, the berry of which, however, is small and apparently deteriorated. It will probably be necessary for the Government at no distant date, if the coffee industry is to be fostered into a trade, to instruct these native cultivators in the proper way of preparing the berry for export. At present the most primitive method is employed. The berries are scraped by hand with a round stone worked in the hollow of a larger stone, and after this process they are washed and dried in the sun. It is obvious that a large crop could not be so dealt with, and that the employment of machinery in the near future is imperative. The initiative will have to be taken by the Government, because of the general ignorance on the part of the natives of all machinery, even of the simplest character, and because no single native cultivator possesses sufficient capital, enterprise, or experience to take the matter in hand. In February, many parts of the Colony were visited by large swarms of locusts. At Accra they took about three

hours in passing over the town, and at the botanical station some damage was done by them to the plantains."

Industries in Florida.—In the *Kew Bulletin*, 1895, pp. 125, 126, a note was given respecting the serious effects on the orange groves of Florida of the extremely cold weather experienced there on the 28th December 1894 and the 7th February 1895. The extent and value of the tropical and sub-tropical cultivation in Florida, including that of orange growing, were very considerable. The following tables are taken from a Foreign Office Report (Annual Series, 1895, No. 1542) on the Agriculture of the Southern States by Mr. Consul C. L. St. John:—

TABLE 1.

RETURN of Vegetables and Garden Products of Florida (Products of 45 Counties) for the Year 1891.

Articles.	Acres.	Quantity.	Classifier.	Value.
				Dollars.
Egg plant	101	5,168	Barrels	15,983
Squashes	219	13,270	„	20,533
Cabbages	2,582	219,388	„	210,320
Beans	977	80,616	Crates	112,823
Cucumbers	798	56,339	„	63,739
English peas	123	5,576	„	6,950
Beets	114	10,865	„	8,533
Water melons	2,897	1,895	Car loads	136,569
Tomatoes	4,098	421,746	Boxes	325,226
Irish potatoes	710	45,020	Bushels	62,149

TABLE 2.

RETURN of the Fruit Crop of Florida for the Year 1891.

Articles.	Bearing Trees.	Quantity.	Classifier.	Value.
				Dollars.
Oranges	2,422,489	3,585,564	Boxes	3,838,517
Lemons	32,431	31,586	„	50,348
Limes	16,694	9,375	„	5,536
Peaches	226,739	74,725	Bushels	83,465
Figs	—	3,714	„	4,146
Plums	—	5,817	„	8,948
Avocado pears	—	542	Barrels	1,605
Sugar apples	4,555	2,783	„	7,824
Pears	199,176	25,366	„	58,254
Grape fruit	12,123	8,744	„	18,627
Bananas	—	50,822	Bunches	22,189
Strawberries	—	1,054,717	Quarts	163,212
Pineapples	—	8,240,180	Apples	612,780
Cocoanuts	55,468	41,910	Nuts	1,702

The Consul adds:—"In giving the foregoing tables showing the various products of the State of Florida it will be understood that I have very much in view that this information will be of value to our people in the British possessions where the climates are like the climate of Florida. It will be seen by the tables how many things are grown in Florida that really can be grown in our tropical and semi-tropical places. In fact, many of the products referred to are now cultivated in the British West India Islands, but not by any means to such extent and on such business principles as carried out in Florida, and which mode of cultivation can alone lead to such money results as are obtained in Florida in such agricultural pursuits."

In a further Foreign Office Report (Annual Series, 1895, No. 1551) the following further particulars are given respecting the disaster that has overtaken the orange industry in Florida:—

"On December 28, 1894, the outlook in Florida was very bright. The orange groves had fruited more generously than usual. Already the growers had marketed about 3,000,000 boxes of oranges at remunerative prices. There were still on the trees 2,500,000 boxes of oranges. But when the morning of December 29 dawned all this had been swept away; for the mercury had fallen to freezing point, and the oranges were found frozen hard. In a few hours fruit worth several millions of dollars had been turned to ice.

"Developments during January, however, seem to confirm the assertion of orange-growers that the December frost had not materially injured the old trees. The weather that followed the Christmas blizzard was exceptionally favourable, and soon it was reported that trees were shedding the leaves that had been blighted, and were putting forth new growth.

"On February 7 everything seemed to point to a good crop; but this cheerful prospect was destined to be succeeded by a condition of hopeless despair, for the mercury, as was mentioned elsewhere in this report, fell to 20 degrees below freezing point. The opinion prevailing is that the last frost was fatal to the trees, and that it will be years before they can recover. No full crop can be expected before 1897. Many of the trees have been split to the ground. Several weeks have elapsed since the cold wave—weeks of the most favourable weather—and no signs of life have been shown by the great majority of the groves. To judge by their appearance, the trees are only fit for firewood."

Persian Zalil.—In the *Kew Bulletin*, 1889, p. 111, a description was given, with a plate from the *Botanical Magazine*, t. 7049, of the Persian dye-plant Zalil. The plant was first described in the *Transactions of the Linnean Society*, sec. 2, vol. iii., p. 30, in the report on the Botany of the Afghan Delimitation Commission from the collections made by Brigade-Surgeon Aitchinson, C.I.E., F.R.S. It is a plant of considerable economic value. The flowers are collected largely for exportation for dyeing silk. The following note on Zalil is taken from the *Journal of the Society of Chemical Industry*, vol. xiv., 31st May 1895, where it appears as a contribution from the Clothworker's Research Laboratory in the Dyeing Department of the Yorkshire College, Leeds, by Professors J. J. Hummel and A. G. Perkin:—

Delphinium Zalil.—This is a perennial herbaceous plant belonging to the *Ranunculaceæ*, which bears a spike of yellow flowers 2 feet in

height. It is abundant in certain parts of Afghanistan, *e.g.*, on the downs of the Badghis, and in the vicinity of Gulran, and in Khorasan.

The dyestuff, known as *Asbarg*, consists of the dried flowers and flowering stems, which are largely exported from Kabul and Khorasan, *viâ* the Punjab, into all parts of India. It is used in the native calico printing, but chiefly in silk-dyeing, along with *Datisca cannabina* roots, and with alum mordant, for the production of a bright sulphur-yellow colour known as *gaudhaki*. Its price is 27½ rupees per cwt.

The chemistry of this dyestuff has still to be studied, and this we hope to do as soon as further supplies, already asked for, come to hand.

The dyeing properties of *Delphinium*, both on wool and cotton, are very similar indeed to those of *Sophora*, from which it differs only by having less dyeing power. Compared with the ordinary dyewood it is, therefore, most similar to quercitron bark, and compared with this dyestuff on wool with tin mordant, it appears that 1·75 grms. quercitron bark are equal in dyeing power to 5 grms. delphinium, but the latter gives a much purer yellow, *i.e.*, less orange. It would, therefore seem to have about half the colouring power of Sophora-buds.

Although quite a good dyestuff for native use, the comparatively low colouring power of *Delphinium Zalil* flowers will prevent it from finding any employment in Europe.